UNION SWITCH & SIGNAL
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SERVICE MANUAL 6488

Description and Operation

CABLINK USER MANUAL

for

Composite Cab Signal System

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SECTION I
GENERAL DESCRIPTION

1.1 INTRODUCTION

a. Background

The UP/C&NW Composite MicroCab™ system maintains a log of internal and external events. Events are organized in a functional hierarchy of event classes. This hierarchy allows informational events to be isolated from failure events through independent classes.

Events from all classes are chronologically queued and time-stamped within the MicroCab™ unit's memory. This queue is of a fixed size and circular in nature such that once it is filled, the oldest entries are deleted as new entries are inserted.

The unit supports a serial data link to allow the most recent events to be uploaded to a PC or dynamically monitored via the PC. The event queue may be cleared from either the PC or the front panel of the unit. Time stamp information is only available through the serial link.

b. Description of Functions

The PC-based CABLINK program provides the means to look at and clear the MicroCab™ system's event logs. With CABLINK, you can

- Upload the event log from the MicroCab™ system for reviewing. This information can be saved to a disk file for future review, if desired.
- Review an uploaded event log, saved to disk in an event log file, using several filtering options.
- Print the uploaded events to a printer or disk file.
- Monitor the MicroCab™ system for new events. In this mode, each new event that occurs is uploaded and displayed immediately on the PC screen. These events can be saved to a disk file for future review, if desired.
- Clear all events. Although the MicroCab™ event log does not "fill up", it is sometimes better to clear it out. This way, only new events show up when you review the log.
- Set the MicroCab™ system date/time clock to match the PC's date and time.

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SECTION II
OPERATION

2.1 Getting started

The PC connects to a MicroCab™ unit with a serial communication cable. The cable can be connected to the MicroCab™ unit at the DB-9 connector located on the front panel of the N451910-0101 CPU PCB or the DB-9 connector located in the Remote Arm Box.

You can connect to serial port COM1 or COM2 on the PC. The software defaults to serial port 1, and can be changed while running the program.

CABLINK software is distributed on diskette. It may be run from the diskette, or copied to the PC's hard disk. To install CABLINK onto a hard disk, copy the contents of the distribution diskette to the desired hard disk sub-directory.

CABLINK runs on IBM PC compatibles with a 720kb floppy drive. A mouse or trackball is supported, but not required.

2.2 How to use it

This section describes the mechanics of operating CABLINK. It tells you how to select actions from the menu bar, how to quit CABLINK, etc.

2.2.1 Menu Bar

At the top of the screen you will see what is called the Menu Bar, containing several choices (Figure 1). By selecting from these choices, you can use CABLINK to access and inspect the event log data on the CAB unit. You can also do things like change the date and time on the CAB unit, or reconfigure the CABLINK side of the PC-to-CAB serial link.

To select an item on the Menu Bar, you can use either the keyboard or the mouse. With the mouse, you click the left button when the mouse cursor is over the item you want. On the keyboard, you press the "Alt" key and the item's "hot key" together. The "hot key" is for each item is highlighted. For instance, to select "Serial", you press the "S" key while holding the "Alt" key down. In the rest of this document, this key combination will be referred to as ALT-S.

2.2.2 Status Line

At the bottom of the screen is the Status Line (Figure 1). This area is used to display the current PC time and the current revision level of the CABLINK program, and to show the hot keys for Help and Exit.

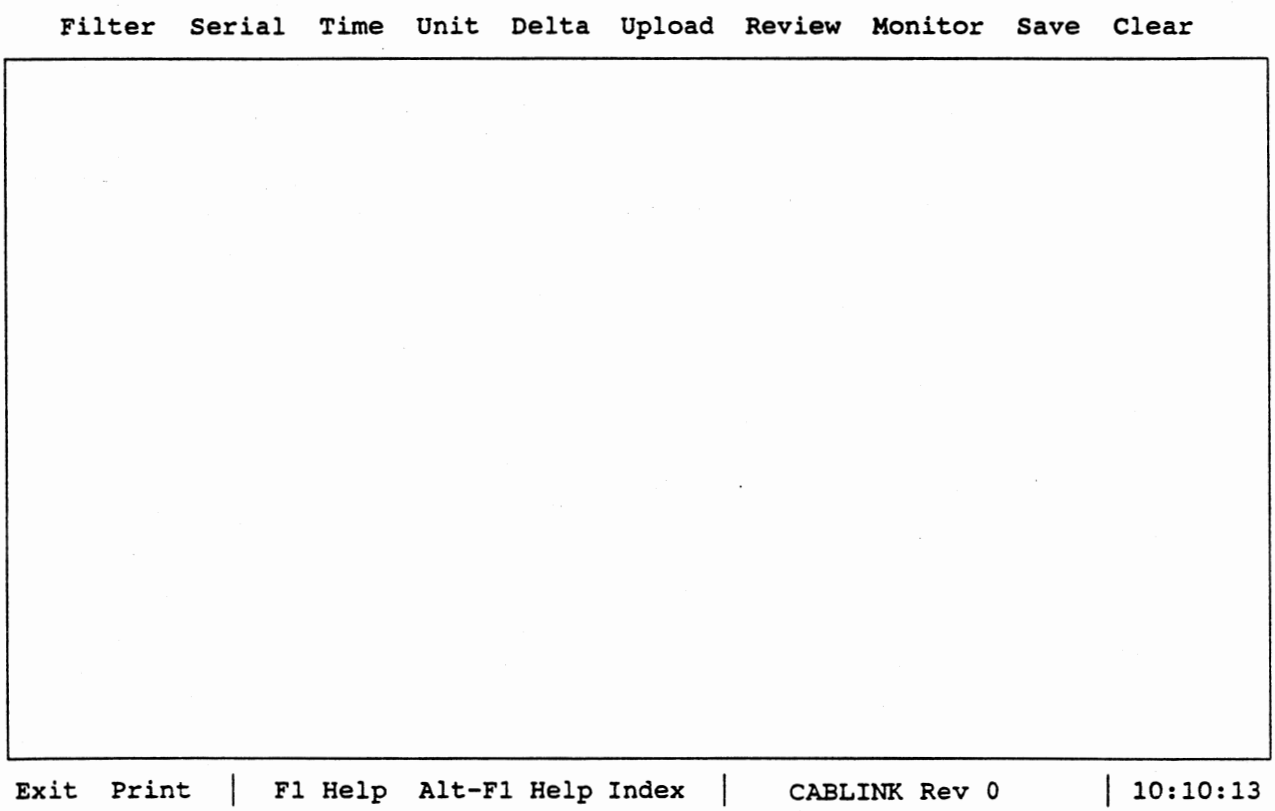
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:10:13

Figure 1

2.2.3 Dialog Boxes

Sometimes CABLINK requires you to choose among several options. Setting the event-viewing filters is one of these (Figure 2). In these cases, you will be shown the available choices and asked to select one or more of them. There are, again, two ways to do this. The mouse can be clicked on the desired choice, or the keyboard can be used. The "Tab" and arrow keys are used to move the highlight from choice to choice. When the item you want is highlighted, press the "Enter" key. If you want to get out of the Dialog Box without making any changes, press "Esc" or click on "Cancel". (See the "Keys" section for more information.)

2.3 STATUS LINE FUNCTIONS

2.3.1 Exit

Use this to quit the CABLINK program and return to DOS. If you've uploaded data, but haven't yet saved it to a permanent disk file, CABLINK will ask if you want to save it before exiting. Press ALT-X or click the mouse on the Status Line where it says "Exit" (Figure 1).

2.3.2 Print

ALT-P pops up the Print Report dialog box. Use this feature if you want to send the event log data to either a printer or a disk file, in the same format as the Review display. If any viewing Filters are set for the Review display, you can turn them off for the report if you wish. (See Figure 3).

This function only works after you have done an UPLOAD, MONITOR, or REVIEW, and uses the event data file from that previous operation.

2.3.3 Help

Context-sensitive help is available most of the time when running CABLINK by pressing the F1 key. If no specific action is being taken when F1 is pressed, "General" help will be displayed (Figure 4).

For help on a specific topic, press ALT-F1 for the Help Topic Index.

2.3.4 Help Index

The Help Topic Index gives you access to information on all aspects of the CABLINK program. Press the ALT-F1 key combination to pop up a scrollable list of available help topics (Figure 5). Information on some help topics is available only via the Help Topic Index.

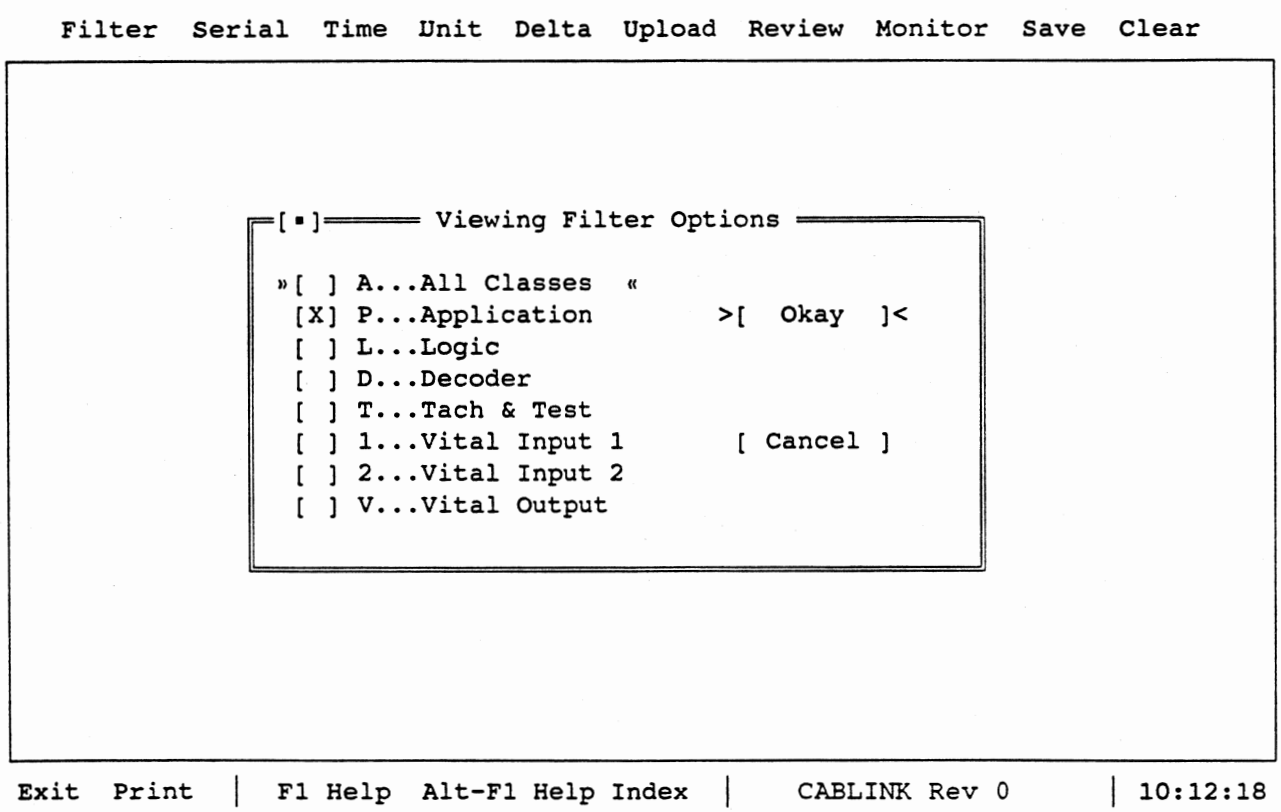
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Viewing Filter Options
»[ ] A...All Classes «
[X] P...Application
[ ] L...Logic
[ ] D...Decoder
[ ] T...Tach & Test
[ ] 1...Vital Input 1
[ ] 2...Vital Input 2
[ ] V...Vital Output
>[Okay]<
[Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:12:18

Figure 2

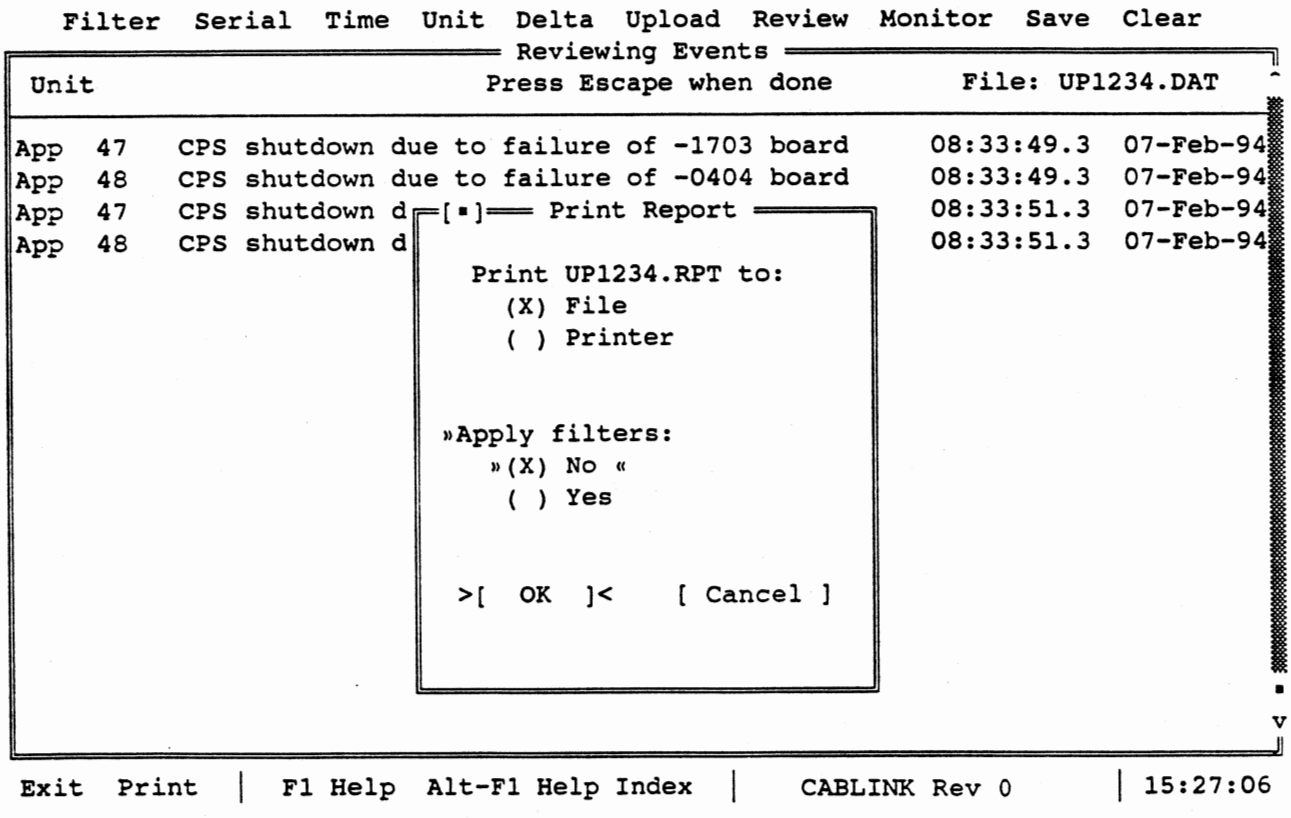
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Reviewing Events
Unit
Press Escape when done
File: UP1234.DAT
App 47 CPS shutdown due to failure of -1703 board 08:33:49.3 07-Feb-94
App 48 CPS shutdown due to failure of -0404 board 08:33:49.3 07-Feb-94
App 47 CPS shutdown d 08:33:51.3 07-Feb-94
App 48 CPS shutdown d 08:33:51.3 07-Feb-94
Print Report
Print UP1234.RPT to:
(X) File
( ) Printer
»Apply filters:
»(X) No «
( ) Yes
>[OK]< [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 15:27:06

Figure 3

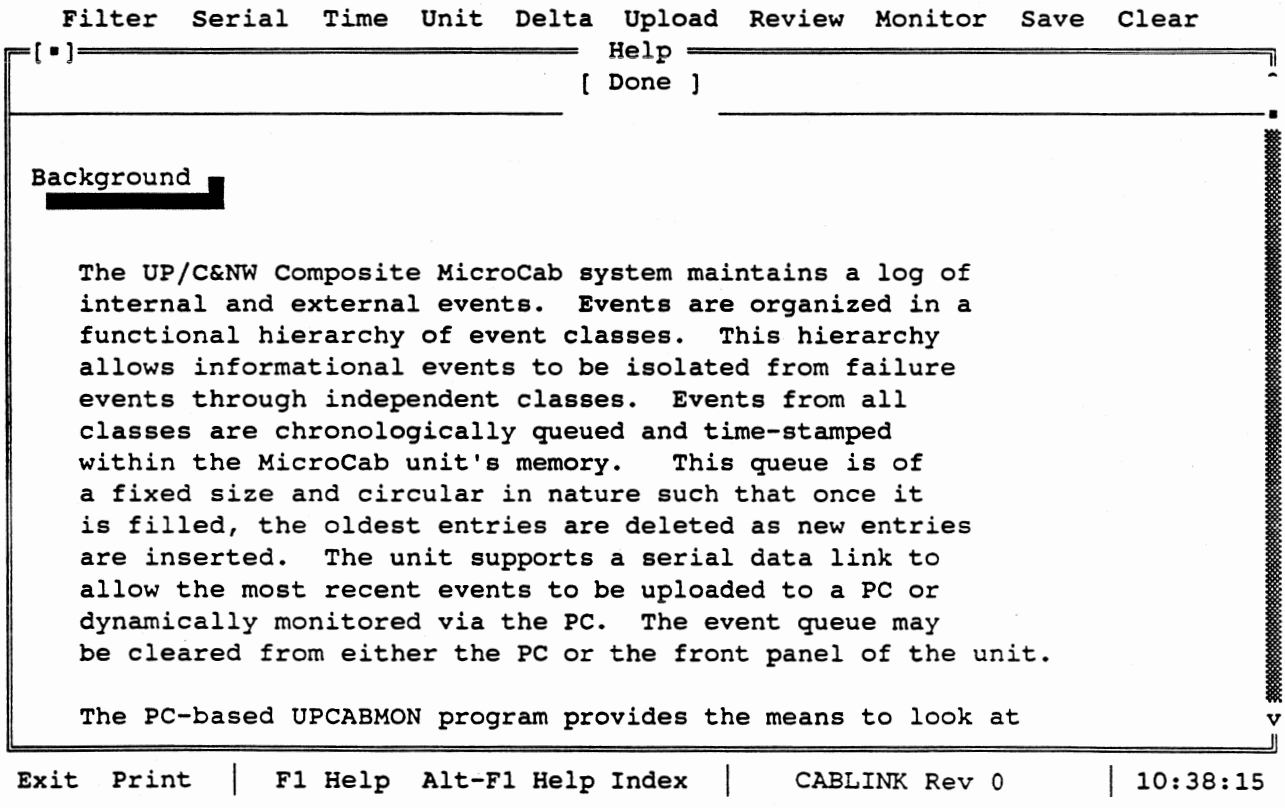
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪]
Help
[Done]
Background
The UP/C&NW Composite MicroCab system maintains a log of internal and external events. Events are organized in a functional hierarchy of event classes. This hierarchy allows informational events to be isolated from failure events through independent classes. Events from all classes are chronologically queued and time-stamped within the MicroCab unit's memory. This queue is of a fixed size and circular in nature such that once it is filled, the oldest entries are deleted as new entries are inserted. The unit supports a serial data link to allow the most recent events to be uploaded to a PC or dynamically monitored via the PC. The event queue may be cleared from either the PC or the front panel of the unit.
The PC-based UPCABMON program provides the means to look at
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:38:15

Figure 4

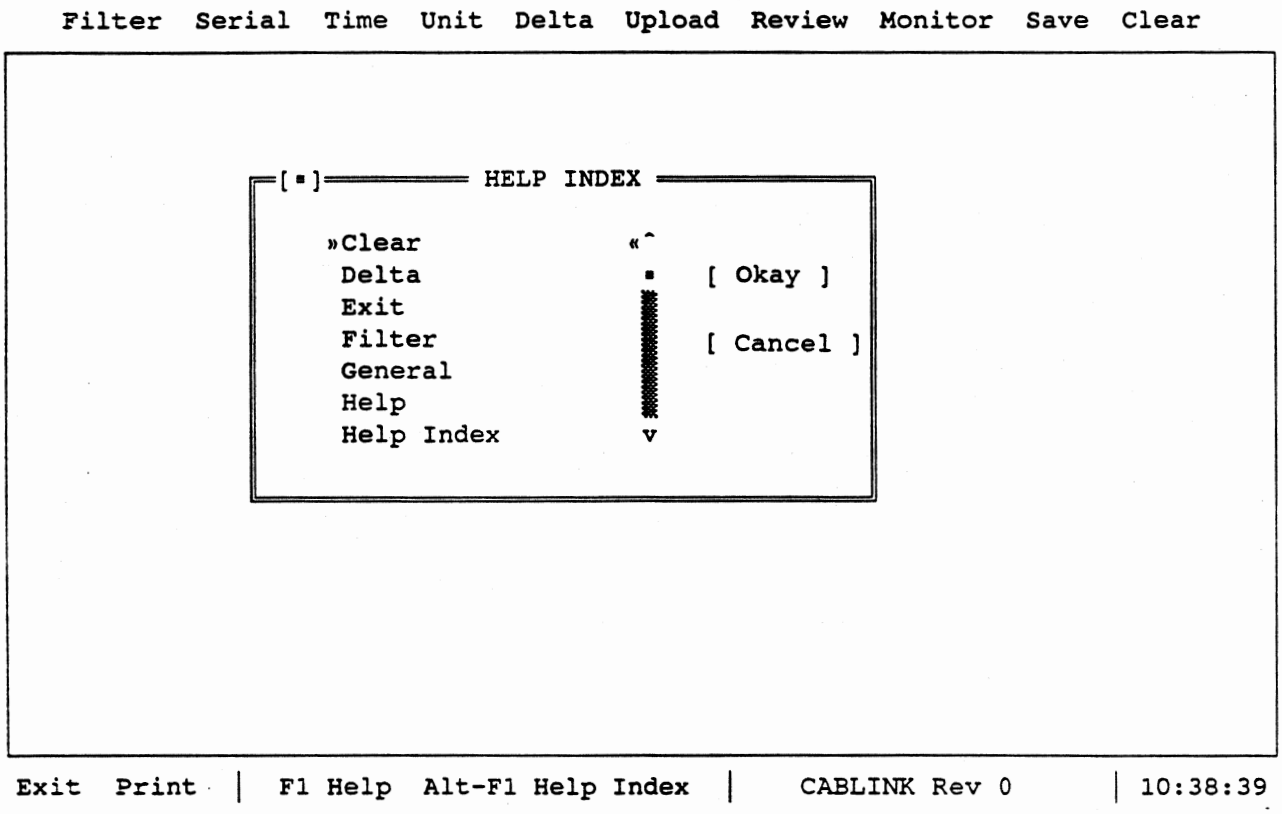
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] HELP INDEX
»Clear
Delta
Exit
Filter
General
Help
Help Index
[Okay]
[Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:38:39

Figure 5

2.4 MENU BAR FUNCTIONS

2.4.1 Filtering

You can either look at ALL the recorded event information in a given data file, or you can filter out selected parts of it. The viewing filter options are:
a) Look at all events, b) Look at all events of a given class (or classes).

To control the filtering options, you first press ALT-F, or click the mouse on the "Filter" menu bar item. A dialog box will pop up, showing the current filter settings (Figure 2). To select or de-select a given item, press the key corresponding to the highlighted letter for that item. For example, press the 'A' key to select "All Classes", and then press it again to DE-select "All Classes". Repeated pressing of the same key toggles that filter item on and off. When you have the filters set the way you want them, press 'O' (for "Okay") or click on the "Okay" button with the mouse. If you change your mind and don't want to change them, press 'Esc" (or click on "Cancel"), and any changes just made will be discarded.

2.4.2 Serial

The Serial Communications Port defaults to the PC's COM1. You can change it to COM2 and back again with this menu choice (ALT-S, Figure 6).

2.4.3 Set CAB Date and Time Clock

The CAB date/time clock can (will) be set to match that of the PC ("Time", ALT-T, Figure 7). CABLINK asks you to confirm that you want to set the CAB clock, and then does so if you respond in the affirmative. Bear in mind that the CAB date/time will be set to match that on the PC you have connected to it, regardless of whether the PC has the correct date & time.

2.4.4 Locomotive Unit Number

The Unit Number is used to create a PC file name, where the uploaded event log data will be stored. Unless you specifically override it, CABLINK will name permanent data files "nnnn.DAT", where the "nnnn" is the Locomotive Unit Number.

A valid Locomotive Unit Number must be entered before you UPLOAD or MONITOR MicroCab™ events. If needed, CABLINK will prompt you to enter one (Figure 8). To be considered a valid unit number, it must be four digits (Figure 9). Thus, "1" should be entered as "0001".

If you wish to change the Unit Number, (when uploading event logs from another locomotive, for instance), select the "Unit" option from the Menu Bar (ALT-N, Figure 10).

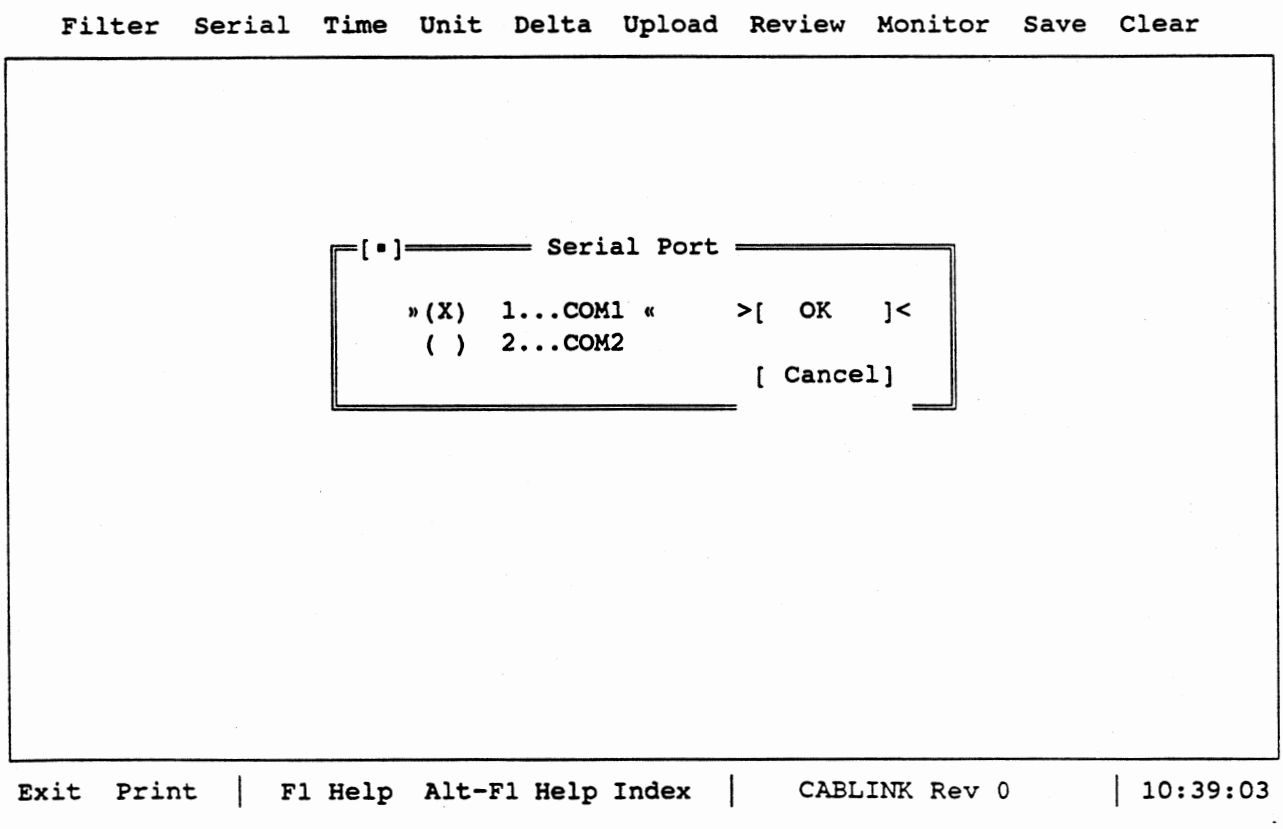
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Serial Port
»(X) 1...COM1 «
( ) 2...COM2
>[OK]<
[Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:39:03

Figure 6

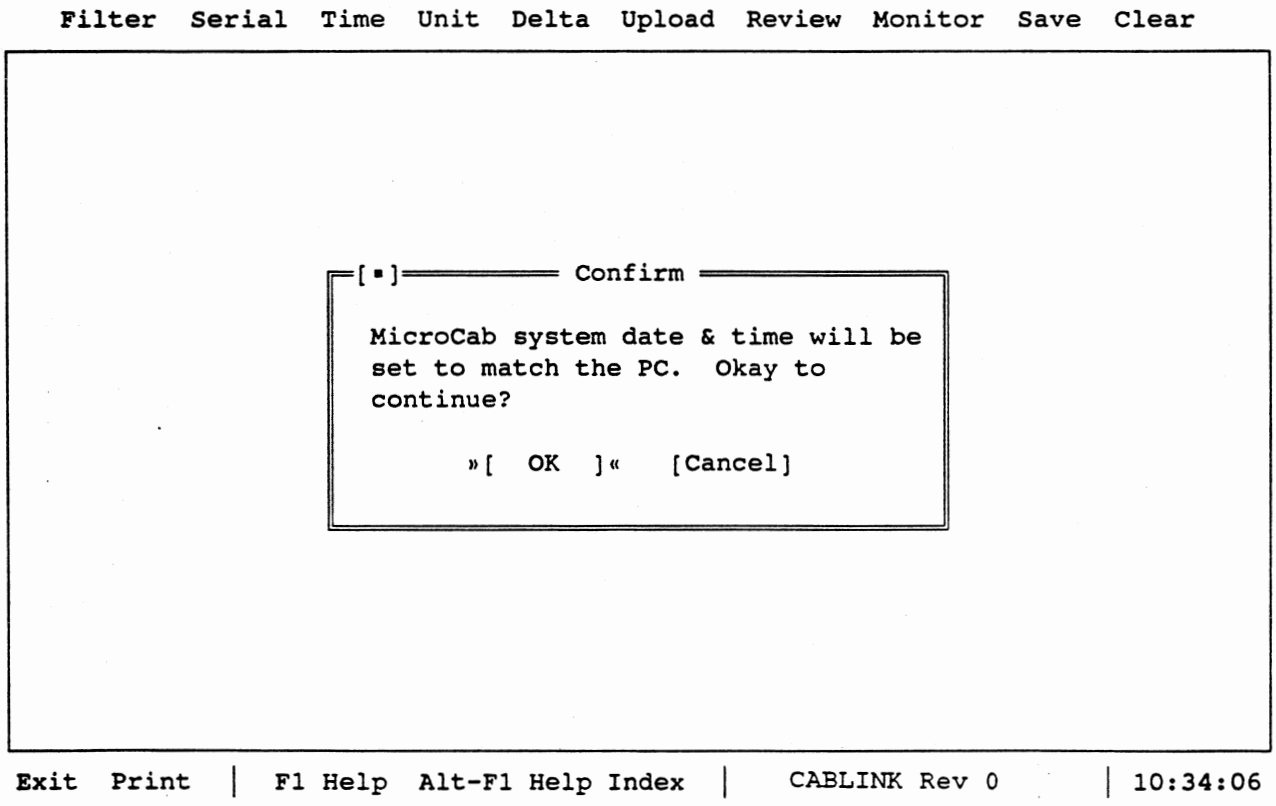
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Confirm
MicroCab system date & time will be set to match the PC. Okay to continue?
»[OK]« [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:34:06

Figure 7

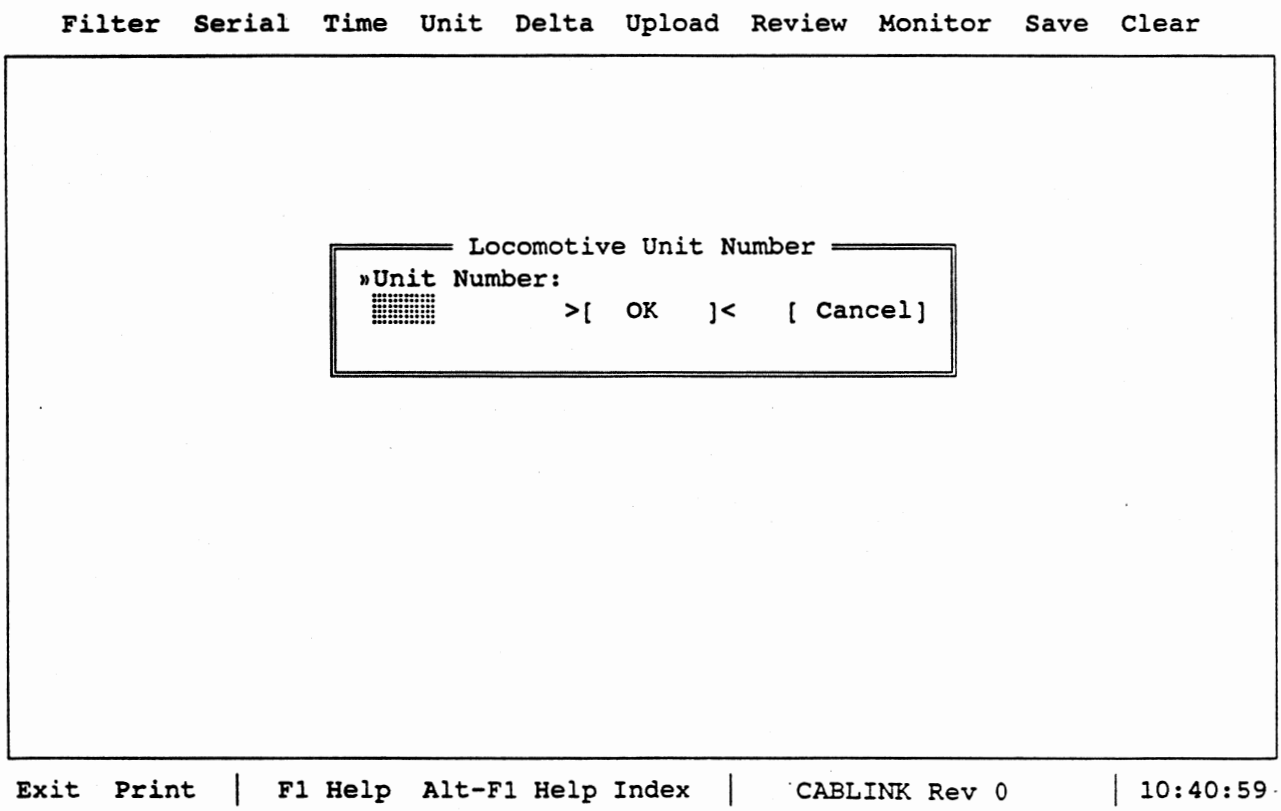
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Locomotive Unit Number
»Unit Number:
>[OK]< [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:40:59

Figure 8

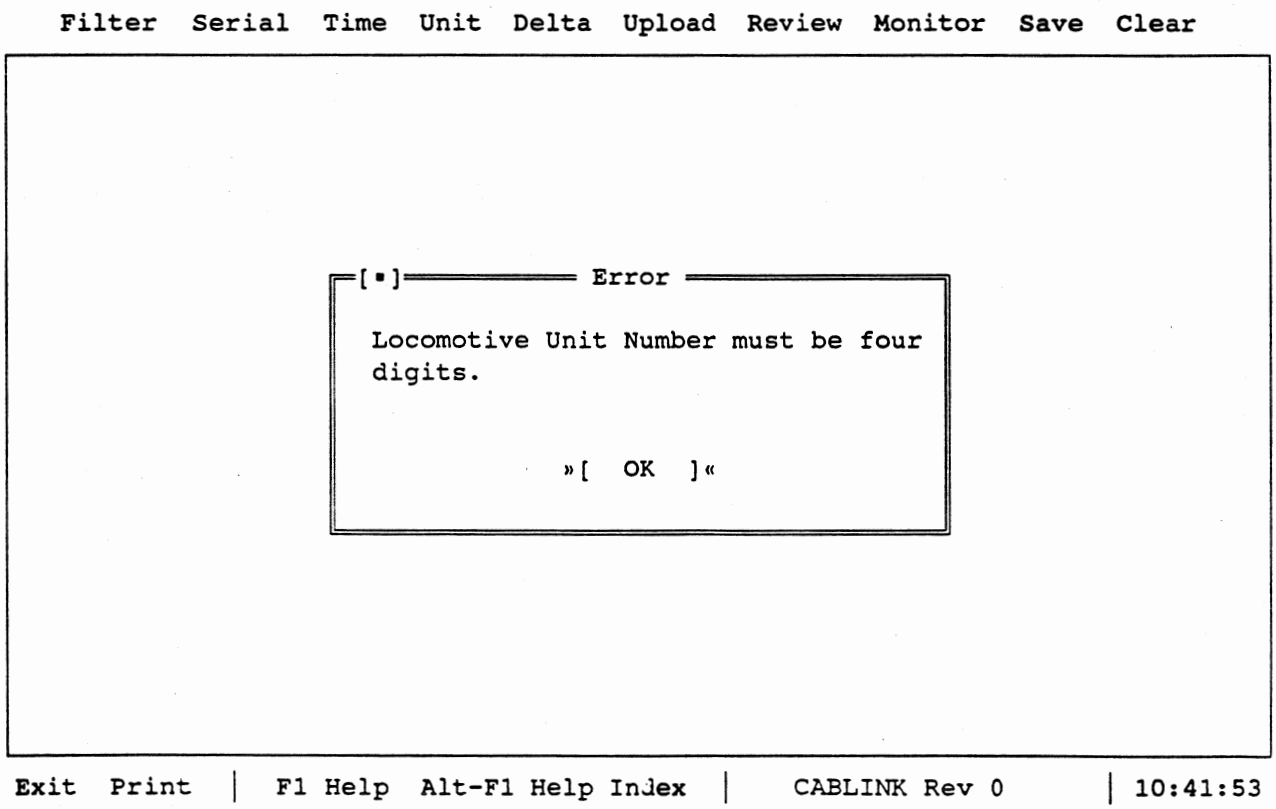
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[•]
Error
Locomotive Unit Number must be four digits.
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:41:53

Figure 9

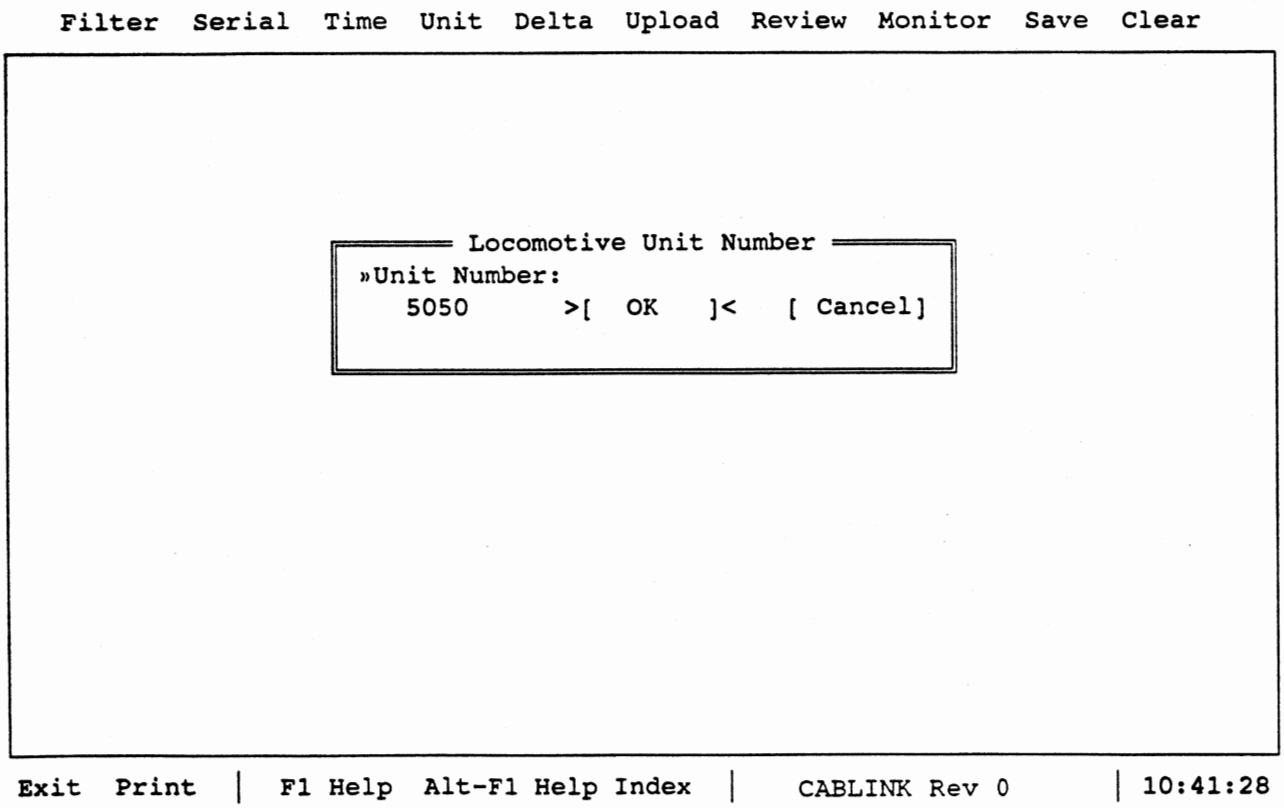
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Locomotive Unit Number
»Unit Number:
5050
>[OK]<
[Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:41:28

Figure 10

2.4.5 Date/Time Delta

Normally, events will be stored and displayed on the PC with an adjusted date & time. That is, the time stamp as received from the CAB unit will be adjusted to match the time frame on the PC. If you do not want this "normalization" to occur, use the "Delta" option (ALT-D) to turn this function off. (NOTE: This option acts as a toggle. If you turn it OFF, you can turn it back ON with the same Menu Bar item, "Delta".) See Figures 11 and 12.

2.4.6 Upload

Before you can review them, you must upload the events stored in the MicroCab™ from the MicroCab™ to the PC (Figure 13). CABLINK puts them in a temporary file. If you want to, you can save them in a permanent event log file on the PC. That way you can view them again later. If you choose NOT to save to a permanent event log file, the next upload will overwrite the current one. You will be asked if you want a permanent event log file when the upload ends. Press ALT-U or click on "Upload" to start.

While the upload is in progress, the display will show the class and code of the event record just received, as a progress indicator, so you can see that something is happening (Figure 14). You can cancel the upload, if you want, by pressing any key.

If a communication error occurs during an upload, an error message will be logged on the PC, and the upload will be resumed, if possible. Thus, if you are viewing the event data file, and you see the "CABLINK Serial Comm Error" event in the event log, this means that at that point in the event log there may have been one or more CAB events that were not successfully received by CABLINK. If, after several tries to re-establish communication, CABLINK still cannot talk to the CAB unit, a diagnostic information message will be displayed, and the upload will be terminated (see Figure 15).

If the event log on the MicroCab™ unit is empty, a message to that effect will be displayed (Figure 16).

2.4.7 Review

Use this to look at event data you got from the MicroCab™ unit. This can be data you just uploaded (with UPLOAD), or data you previously uploaded at some point in the past. When you select "Review" from the Menu Bar (by pressing ALT-R), you will be asked to choose a name for the disk file where the event data is stored (Figure 17). You can either enter a name of your own choosing (by typing it in), or select an existing data file. To select a data file, press enter, to move the highlight down to the file list. Then use the arrow keys to move the highlight around from name to name, until the file you want to review is highlighted (Figure 18). Now press "Enter".

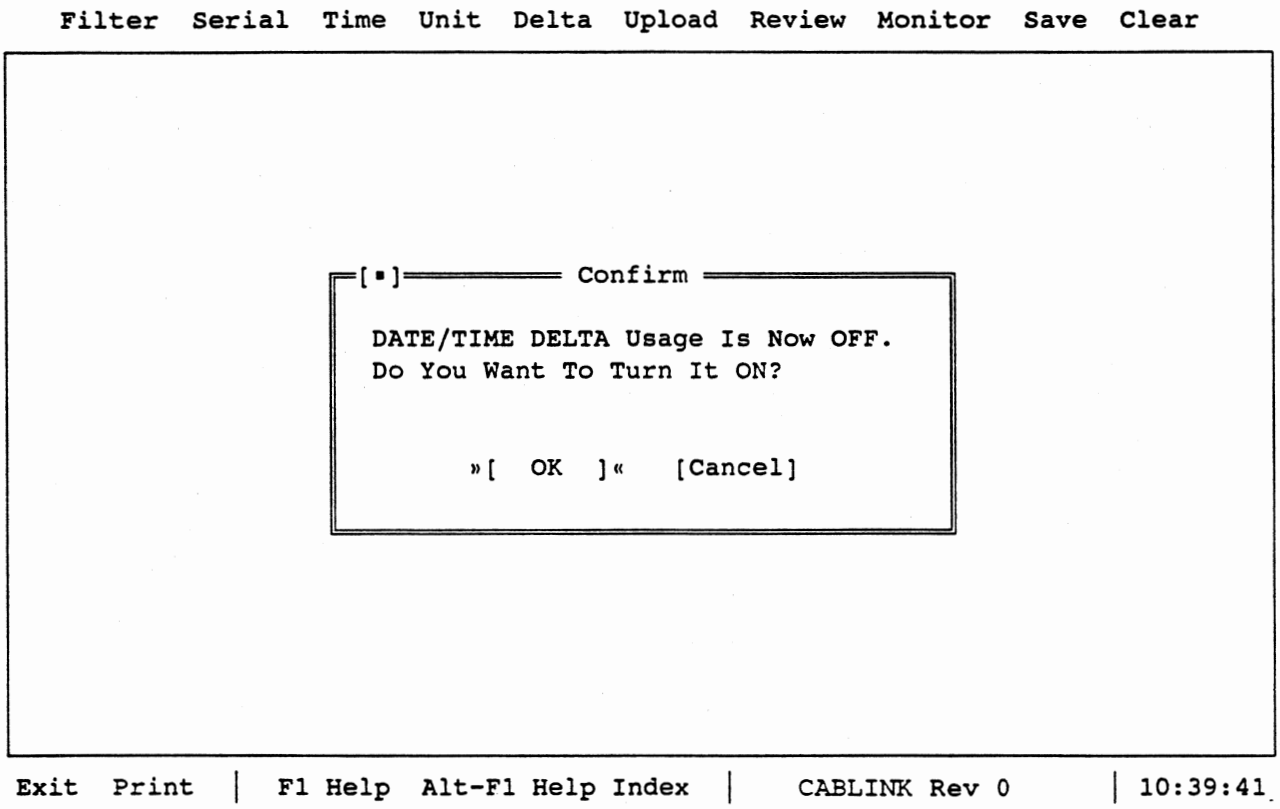
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Confirm
DATE/TIME DELTA Usage Is Now OFF.
Do You Want To Turn It ON?
»[OK]« [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:39:41

Figure 11

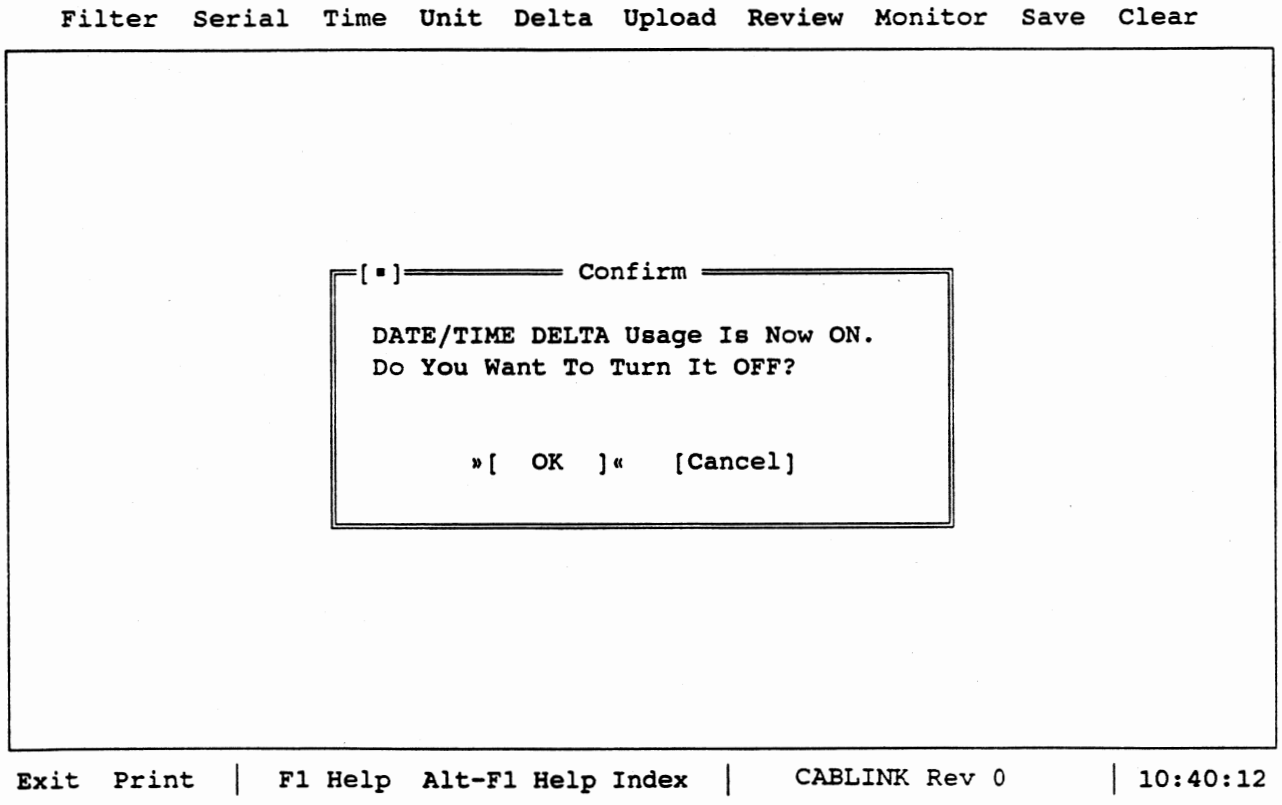
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Confirm
DATE/TIME DELTA Usage Is Now ON.
Do You Want To Turn It OFF?
»[OK]« [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:40:12

Figure 12

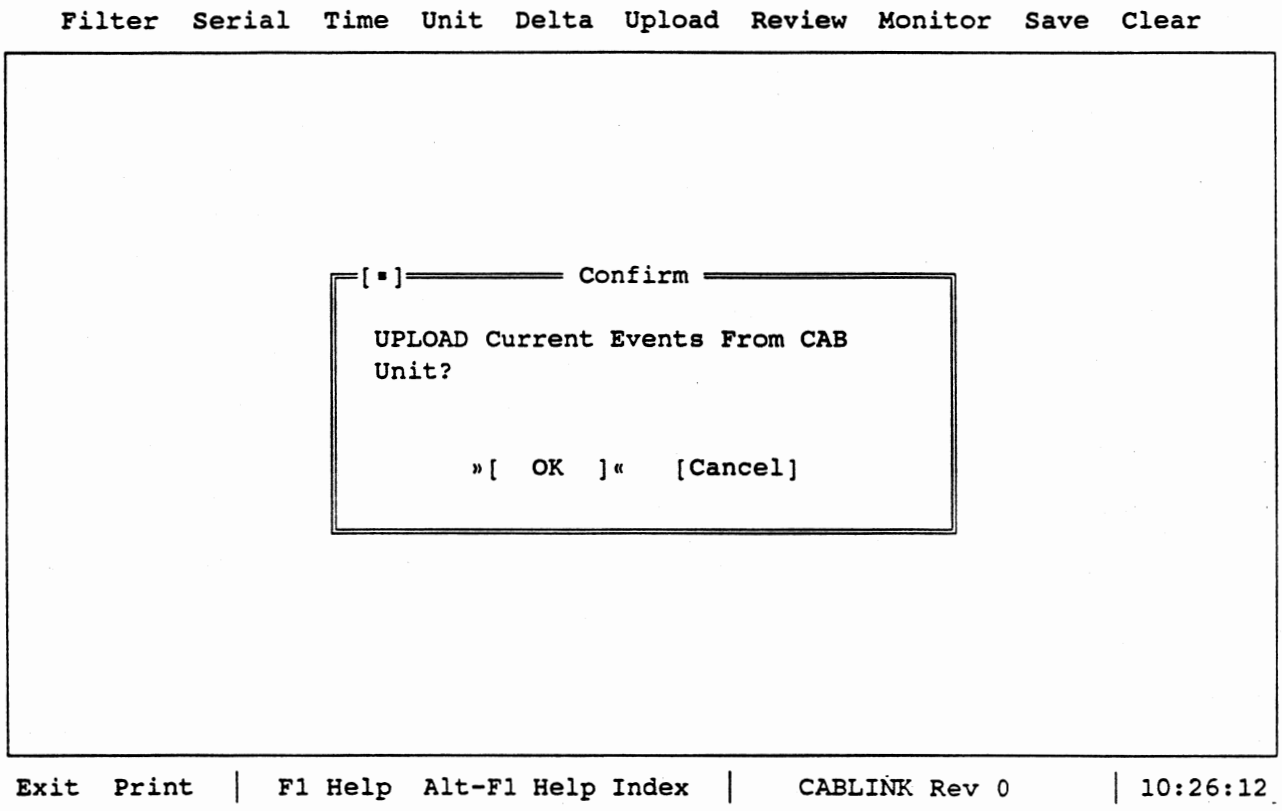
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Confirm
UPLOAD Current Events From CAB Unit?
»[OK]« [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:26:12

Figure 13

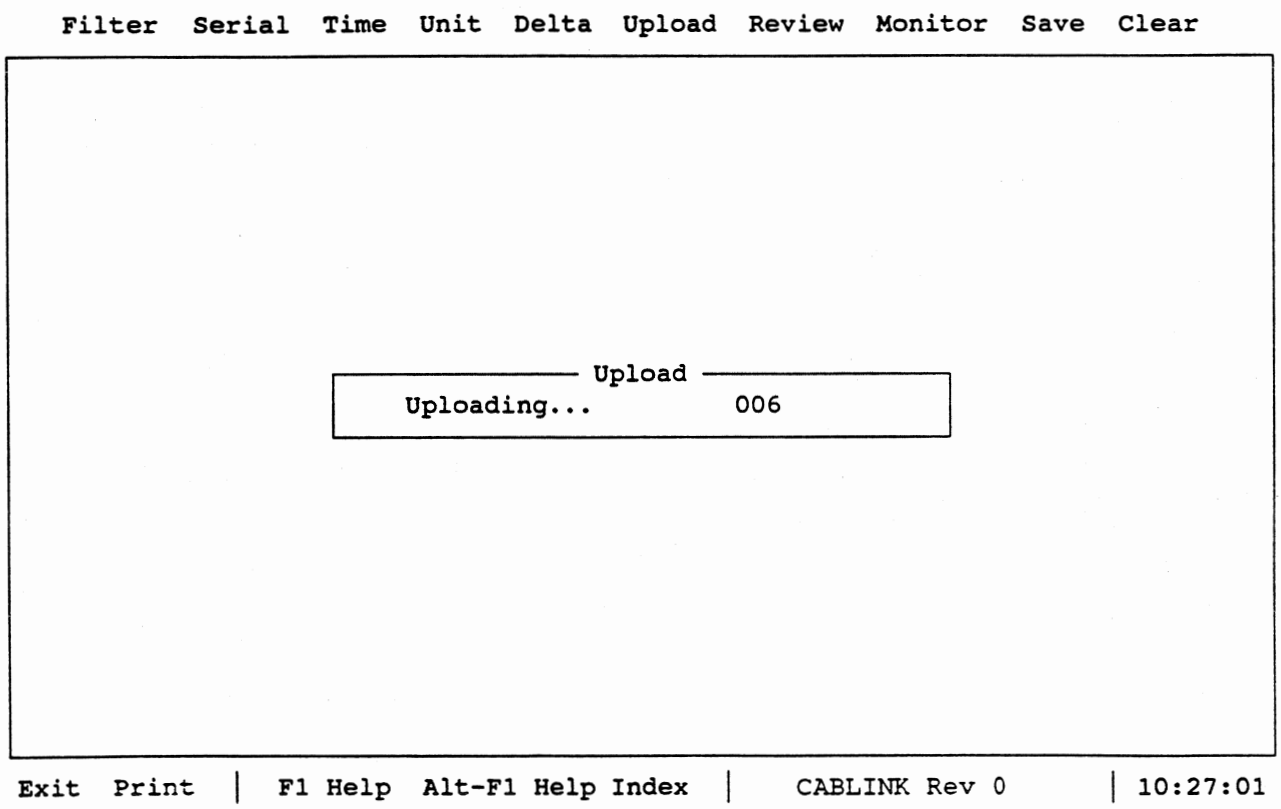
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Upload
Uploading... 006
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:27:01

Figure 14

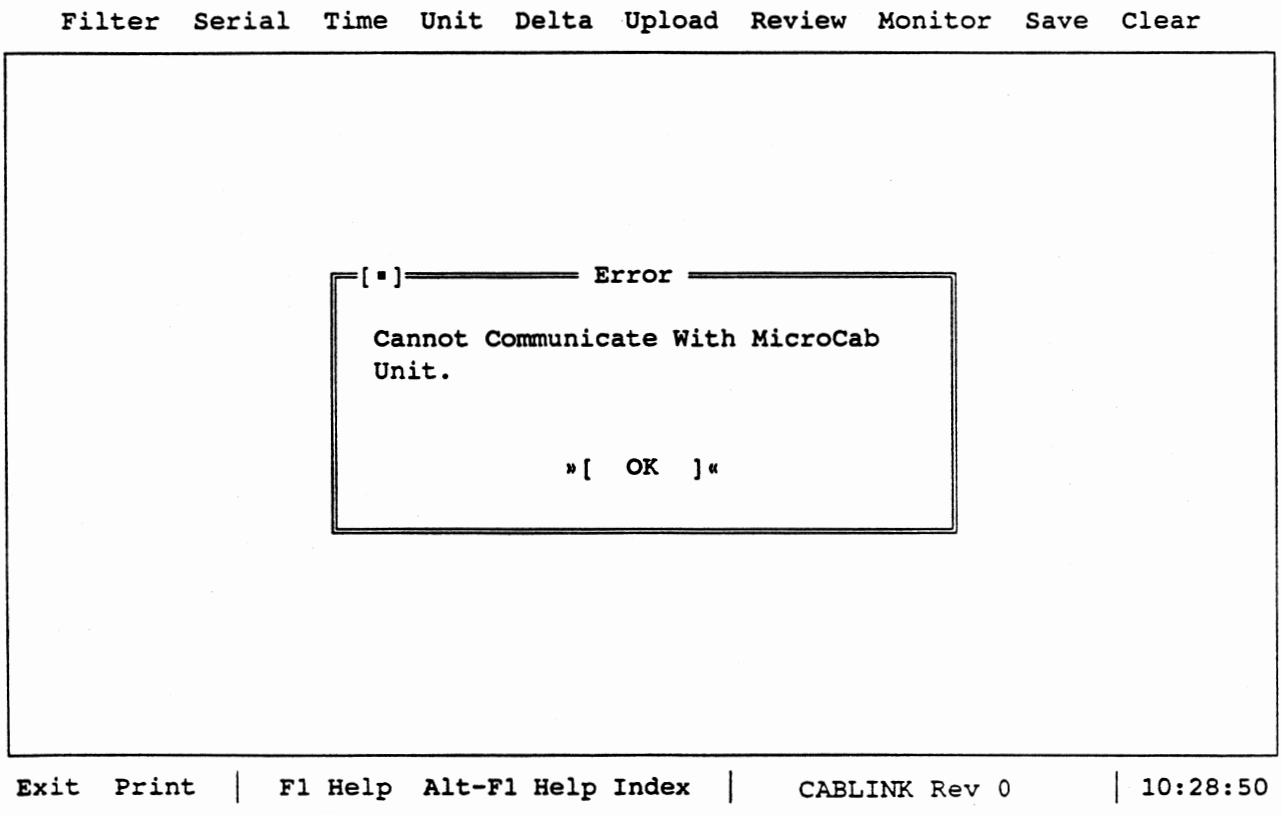
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪]
Error
Cannot Communicate With MicroCab Unit.
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:28:50

Figure 15

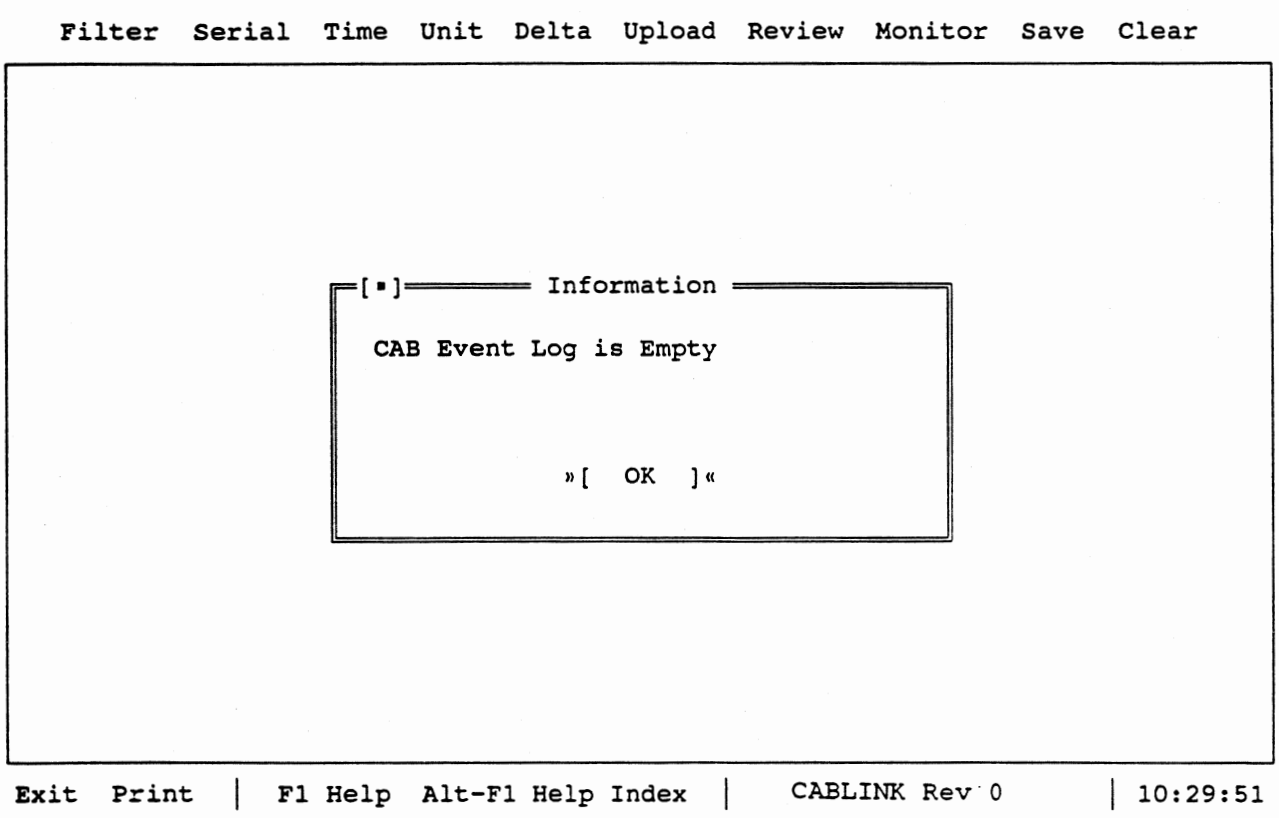
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Information
CAB Event Log is Empty
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:29:51

Figure 1.6

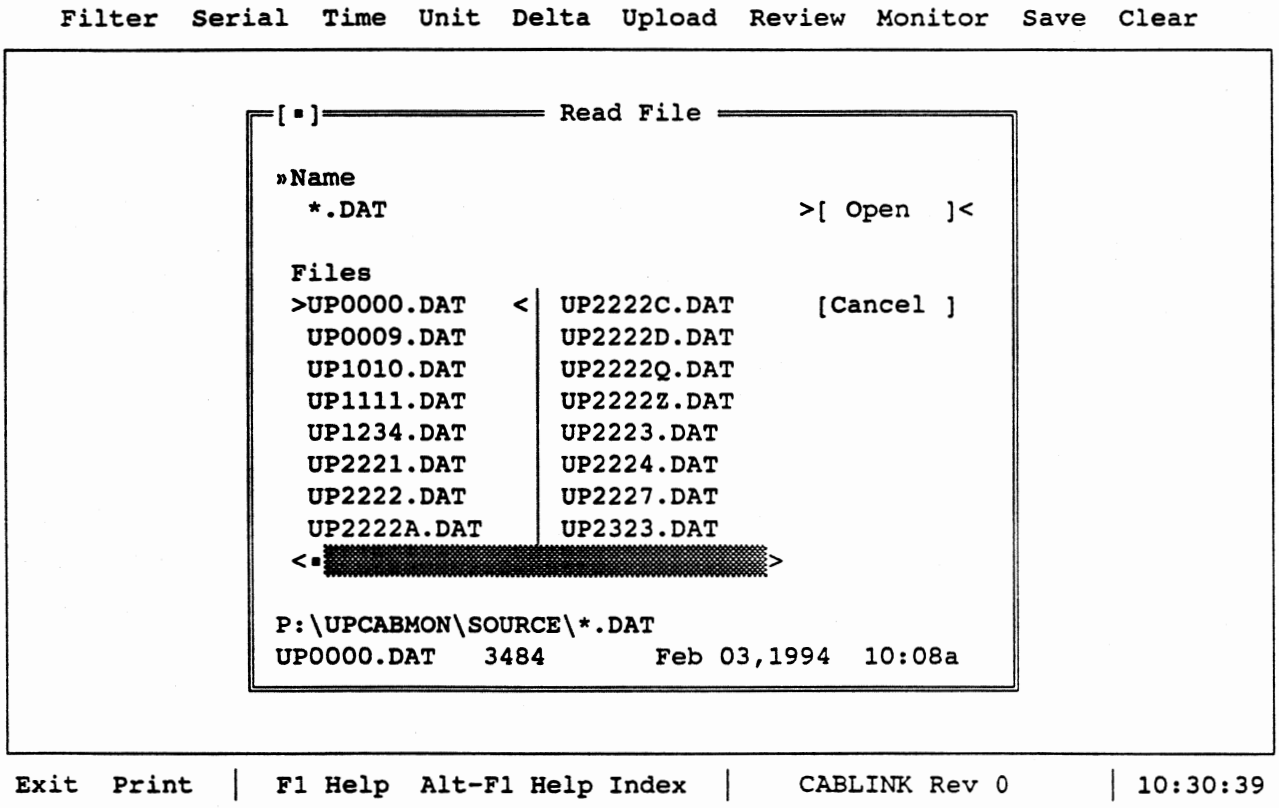
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Read File
»Name
*.DAT
>[Open]<
Files
>UP0000.DAT
UP0009.DAT
UP1010.DAT
UP1111.DAT
UP1234.DAT
UP2221.DAT
UP2222.DAT
UP2222A.DAT
UP2222C.DAT
UP2222D.DAT
UP2222Q.DAT
UP2222Z.DAT
UP2223.DAT
UP2224.DAT
UP2227.DAT
UP2323.DAT
[Cancel]
P:\UPCABMON\SOURCE*.DAT
UP0000.DAT 3484 Feb 03,1994 10:08a
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:30:39

Figure 17

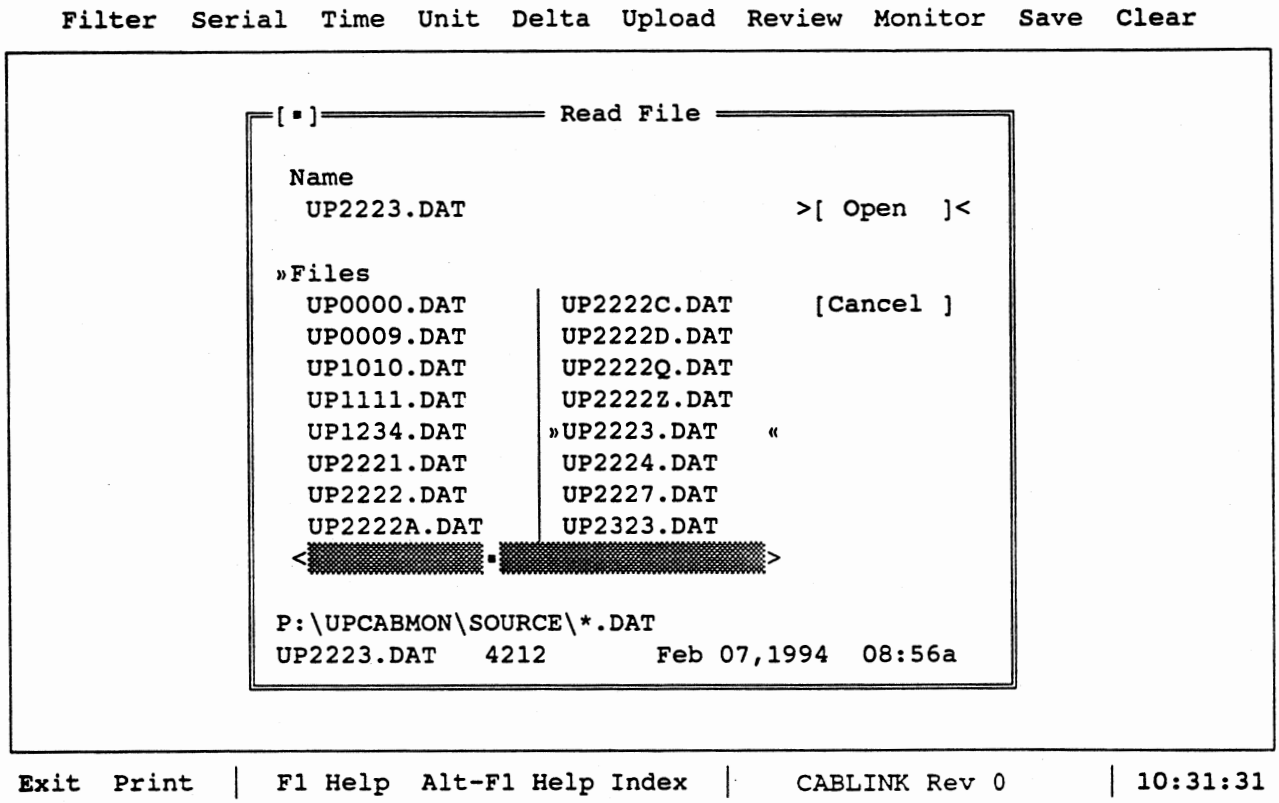
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Read File
Name
UP2223.DAT
>[Open]<
»Files
UP0000.DAT
UP0009.DAT
UP1010.DAT
UP1111.DAT
UP1234.DAT
UP2221.DAT
UP2222.DAT
UP2222A.DAT
UP2222C.DAT
UP2222D.DAT
UP2222Q.DAT
UP2222Z.DAT
»UP2223.DAT «
UP2224.DAT
UP2227.DAT
UP2323.DAT
[Cancel]
P:\UPCABMON\SOURCE*.DAT
UP2223.DAT 4212 Feb 07,1994 08:56a
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:31:31

Figure 18

The logged event information is presented as shown in Figure 19. The first column is the event Class, then the event Code within the Class. Descriptive text for that specific event is next, followed by the time and date when the event occurred. Note that the most recent events are at the bottom of the list, and that the viewer screen is automatically scrolled to the bottom when first displayed (Figure 19). You can use the arrow keys, PageUp and PageDown, Ctrl-PageUp and Ctrl-PageDown to move up and down within the listed events.

You can either look at ALL the recorded event information in a given data file, or you can filter out selected parts of it. The viewing filter options are:

a) Look at all events
b) Look at all events of a given class (or classes)

To control the filtering options, you first press ALT-F, or click the mouse on the "Filter" menu bar item. A dialog box will pop up, showing the current filter settings (Figure 20). To select or de-select a given item, press the key corresponding to the highlighted letter for that item. For example, press the 'A' key to select "All Classes", and then press it again to DE-select "All Classes". Repeated pressing of the same key toggles that filter item on and off. When you have the filters set the way you want them, press 'O' (for "Okay") or click on the "Okay" button with the mouse. If you change your mind and don't want to change them, press 'Esc" (or click on "Cancel"), and any changes just made will be discarded.

If you have been reviewing data from the most recent upload, and you wish to save it under a different file name, select the "Save" option from the Menu Bar (Figure 21). The file name defaults to the current locomotive unit number + ".DAT", but you can change the filename.

If you wish to review another set of data, select the "Review" option from the Menu Bar again. As before, you will be asked to choose a name for the disk file where the event data is stored.

2.4.8 Monitor

Monitoring is used to see new events as they occur. To activate, press ALT-M. Any existing event log data will be uploaded to the default file UPLOAD.DAT, and simultaneously displayed on the screen (Figure 22). Then CABLINK will sit and wait for any new events that occur on the CAB unit, which will then be uploaded and displayed as they occur. The display of existing and new events is done according to the selected filtering options. When finished, you will be asked whether you want to save the events to a permanent event log file on disk (Figure 21).

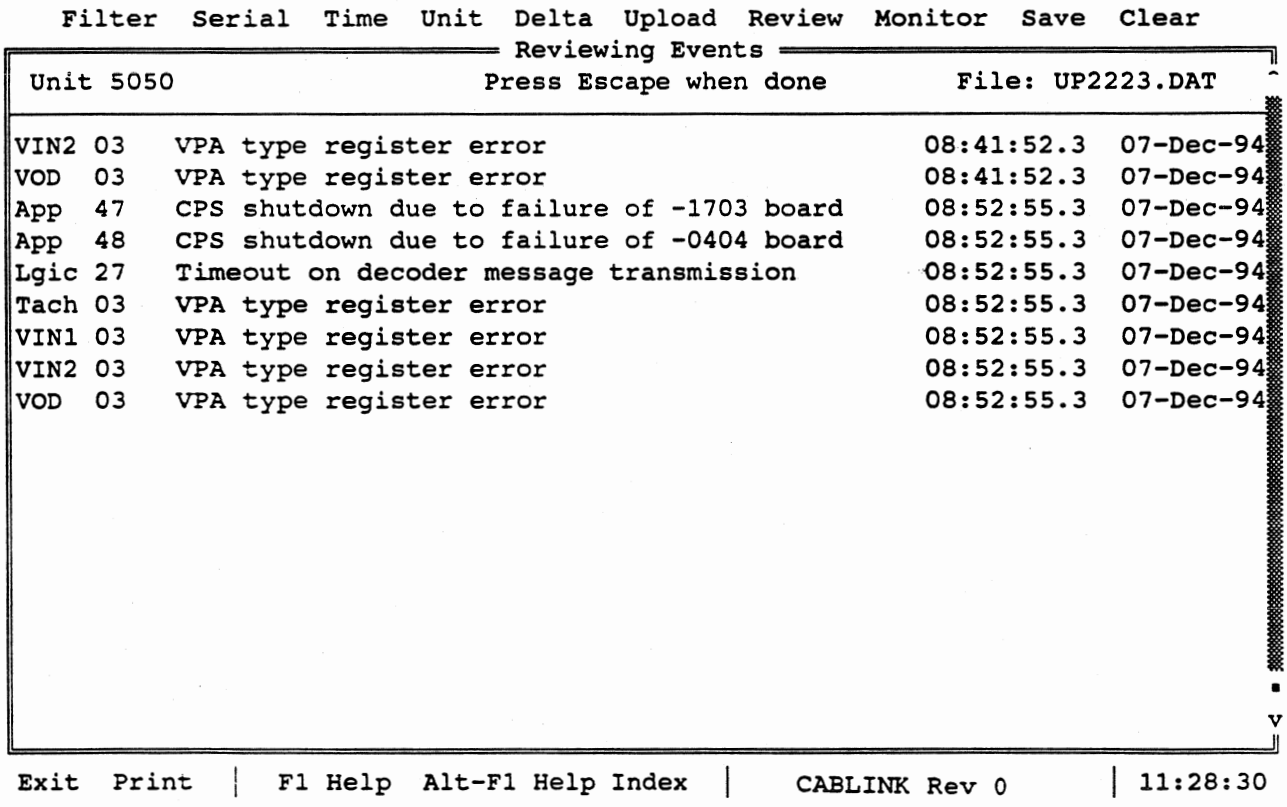
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Reviewing Events
Unit 5050
Press Escape when done
File: UP2223.DAT
VIN2 03 VPA type register error 08:41:52.3 07-Dec-94
VOD 03 VPA type register error 08:41:52.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:52:55.3 07-Dec-94
App 48 CPS shutdown due to failure of -0404 board 08:52:55.3 07-Dec-94
Lgic 27 Timeout on decoder message transmission 08:52:55.3 07-Dec-94
Tach 03 VPA type register error 08:52:55.3 07-Dec-94
VIN1 03 VPA type register error 08:52:55.3 07-Dec-94
VIN2 03 VPA type register error 08:52:55.3 07-Dec-94
VOD 03 VPA type register error 08:52:55.3 07-Dec-94
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 11:28:30

Figure 19

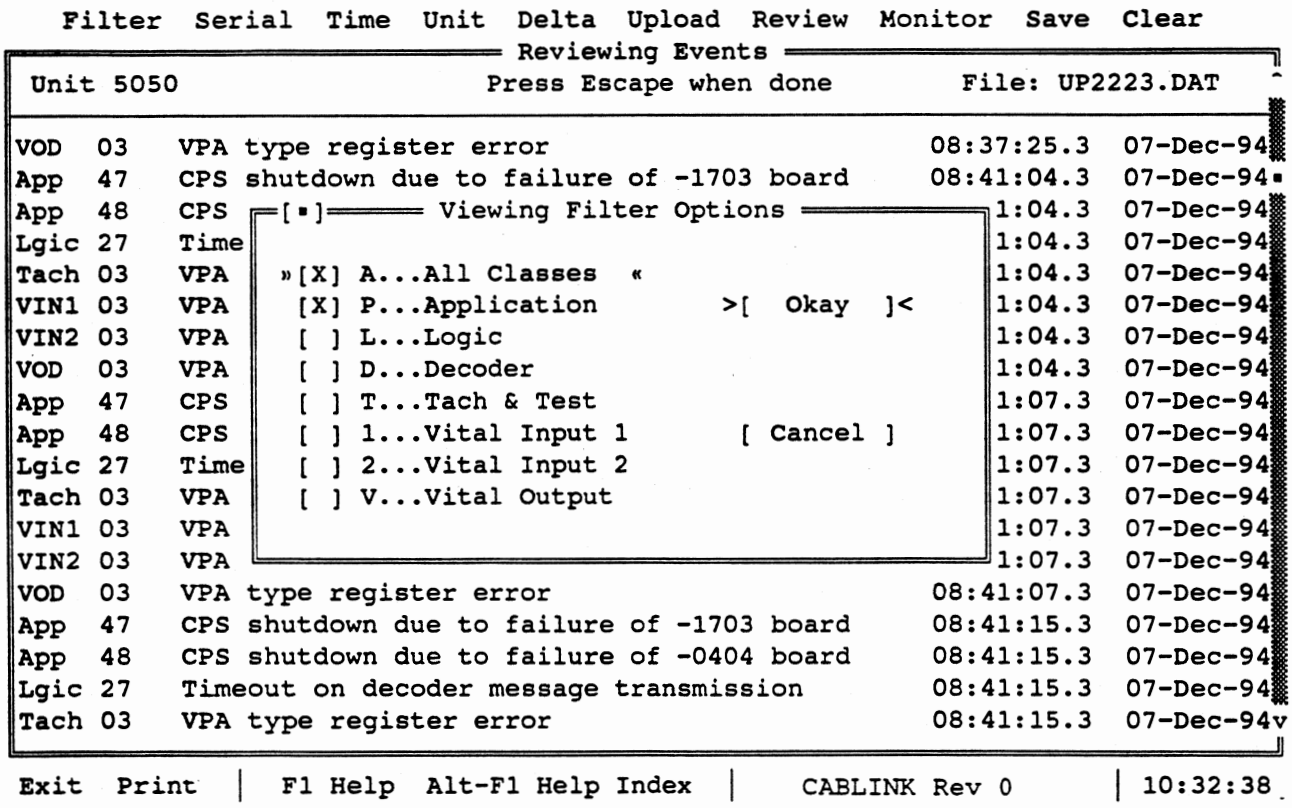
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Reviewing Events
Unit 5050
Press Escape when done
File: UP2223.DAT
VOD 03 VPA type register error 08:37:25.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:41:04.3 07-Dec-94
App 48 CPS
Lgic 27 Time
Tach 03 VPA
VIN1 03 VPA
VIN2 03 VPA
VOD 03 VPA
App 47 CPS
App 48 CPS
Lgic 27 Time
Tach 03 VPA
VIN1 03 VPA
VIN2 03 VPA
Viewing Filter Options
»[X] A...All Classes «
[X] P...Application
[ ] L...Logic
[ ] D...Decoder
[ ] T...Tach & Test
[ ] 1...Vital Input 1
[ ] 2...Vital Input 2
[ ] V...Vital Output
>[Okay]<
[Cancel]
1:04.3 07-Dec-94
1:04.3 07-Dec-94
1:04.3 07-Dec-94
1:04.3 07-Dec-94
1:04.3 07-Dec-94
1:04.3 07-Dec-94
1:07.3 07-Dec-94
1:07.3 07-Dec-94
1:07.3 07-Dec-94
1:07.3 07-Dec-94
1:07.3 07-Dec-94
1:07.3 07-Dec-94
VOD 03 VPA type register error 08:41:07.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:41:15.3 07-Dec-94
App 48 CPS shutdown due to failure of -0404 board 08:41:15.3 07-Dec-94
Lgic 27 Timeout on decoder message transmission 08:41:15.3 07-Dec-94
Tach 03 VPA type register error 08:41:15.3 07-Dec-94
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:32:38

Figure 20

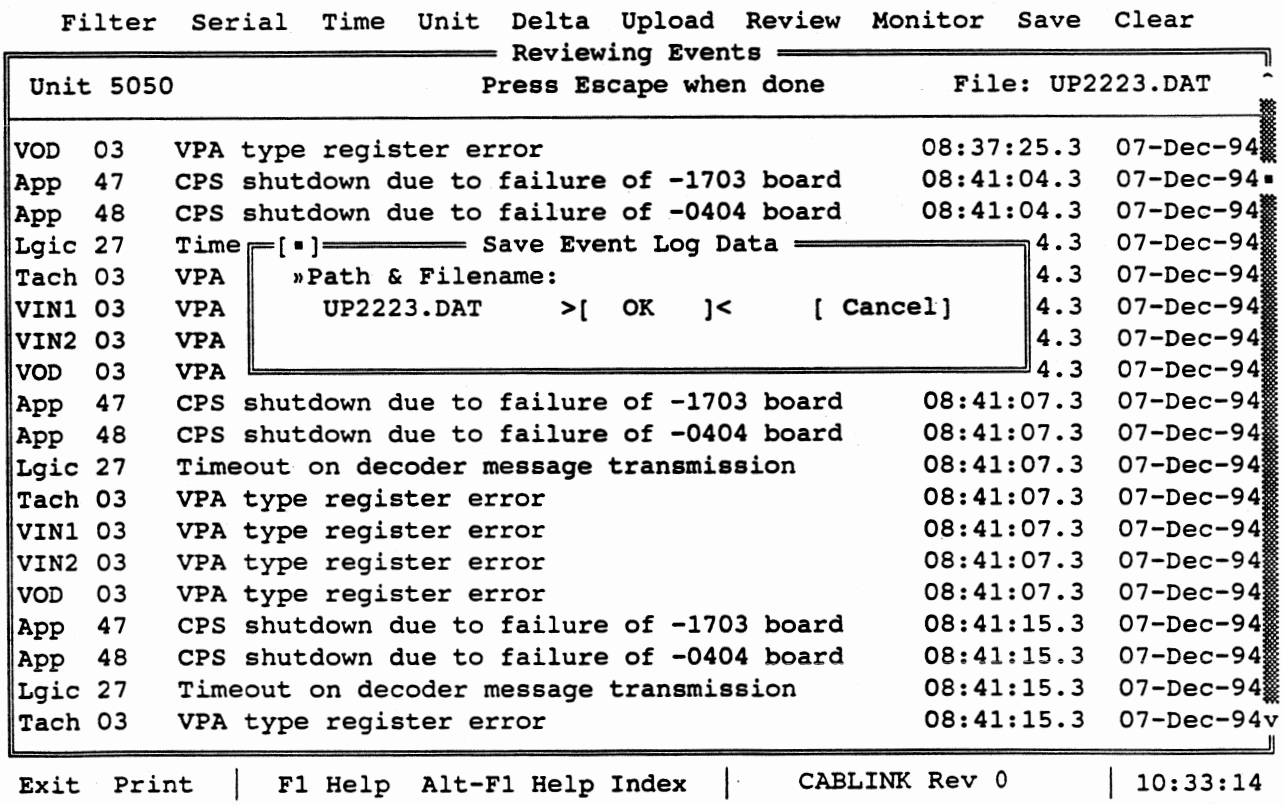
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Reviewing Events
Unit 5050
Press Escape when done
File: UP2223.DAT
VOD 03 VPA type register error 08:37:25.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:41:04.3 07-Dec-94
App 48 CPS shutdown due to failure of -0404 board 08:41:04.3 07-Dec-94
Lgic 27 Time
Tach 03 VPA
VIN1 03 VPA
VIN2 03 VPA
VOD 03 VPA
Save Event Log Data
»Path & Filename:
UP2223.DAT >[OK]< [Cancel]
4.3 07-Dec-94
4.3 07-Dec-94
4.3 07-Dec-94
4.3 07-Dec-94
4.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:41:07.3 07-Dec-94
App 48 CPS shutdown due to failure of -0404 board 08:41:07.3 07-Dec-94
Lgic 27 Timeout on decoder message transmission 08:41:07.3 07-Dec-94
Tach 03 VPA type register error 08:41:07.3 07-Dec-94
VIN1 03 VPA type register error 08:41:07.3 07-Dec-94
VIN2 03 VPA type register error 08:41:07.3 07-Dec-94
VOD 03 VPA type register error 08:41:07.3 07-Dec-94
App 47 CPS shutdown due to failure of -1703 board 08:41:15.3 07-Dec-94
App 48 CPS shutdown due to failure of -0404 board 08:41:15.3 07-Dec-94
Lgic 27 Timeout on decoder message transmission 08:41:15.3 07-Dec-94
Tach 03 VPA type register error 08:41:15.3 07-Dec-94
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:33:14

Figure 21

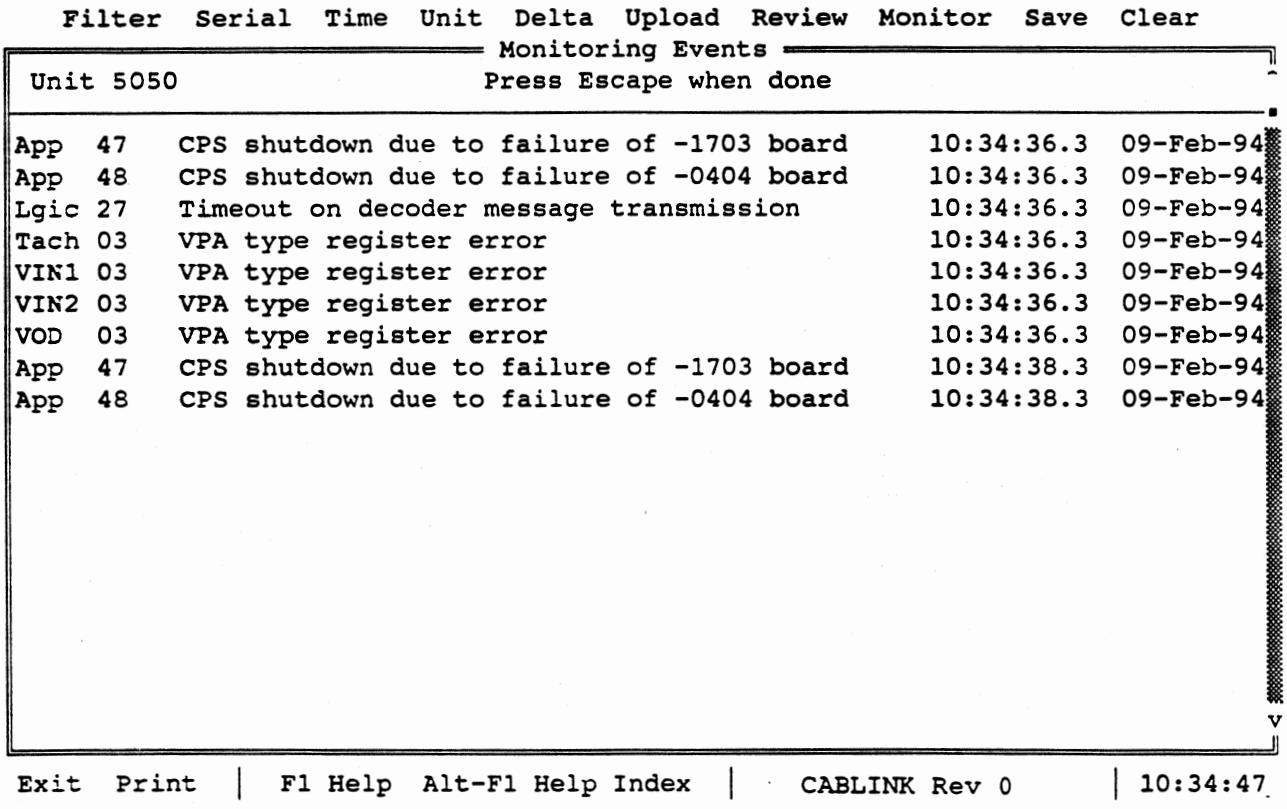
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Monitoring Events
Unit 5050
Press Escape when done
App 47 CPS shutdown due to failure of -1703 board 10:34:36.3 09-Feb-94
App 48 CPS shutdown due to failure of -0404 board 10:34:36.3 09-Feb-94
Lgic 27 Timeout on decoder message transmission 10:34:36.3 09-Feb-94
Tach 03 VPA type register error 10:34:36.3 09-Feb-94
VIN1 03 VPA type register error 10:34:36.3 09-Feb-94
VIN2 03 VPA type register error 10:34:36.3 09-Feb-94
VOD 03 VPA type register error 10:34:36.3 09-Feb-94
App 47 CPS shutdown due to failure of -1703 board 10:34:38.3 09-Feb-94
App 48 CPS shutdown due to failure of -0404 board 10:34:38.3 09-Feb-94
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:34:47

Figure 22

2.4.9 Save Data

If you want to save the current event log file to a different name, select the "Save" menu bar option (ALT-A, Figure 23). This enables you to type in a new name for the file, including a path name.

If you want to save the uploaded data to a diskette, put the diskette drive letter in the file name, like this -

A:UP1234.DAT

You can enter up to 80 characters in the path name, although you can only see 11 at any time (Figure 24).

If the name you enter already exists (Figure 25), you can choose either to overwrite the old one, or enter a new, different name.

2.4.10 Clear Events

This function (ALT-C) clears ALL events logged in the MicroCab™ system's event log (Figure 26). The filtering options have no effect on this operation, and it cannot be aborted once begun. CABLINK will ask you to confirm your intent to clear the logs before proceeding.

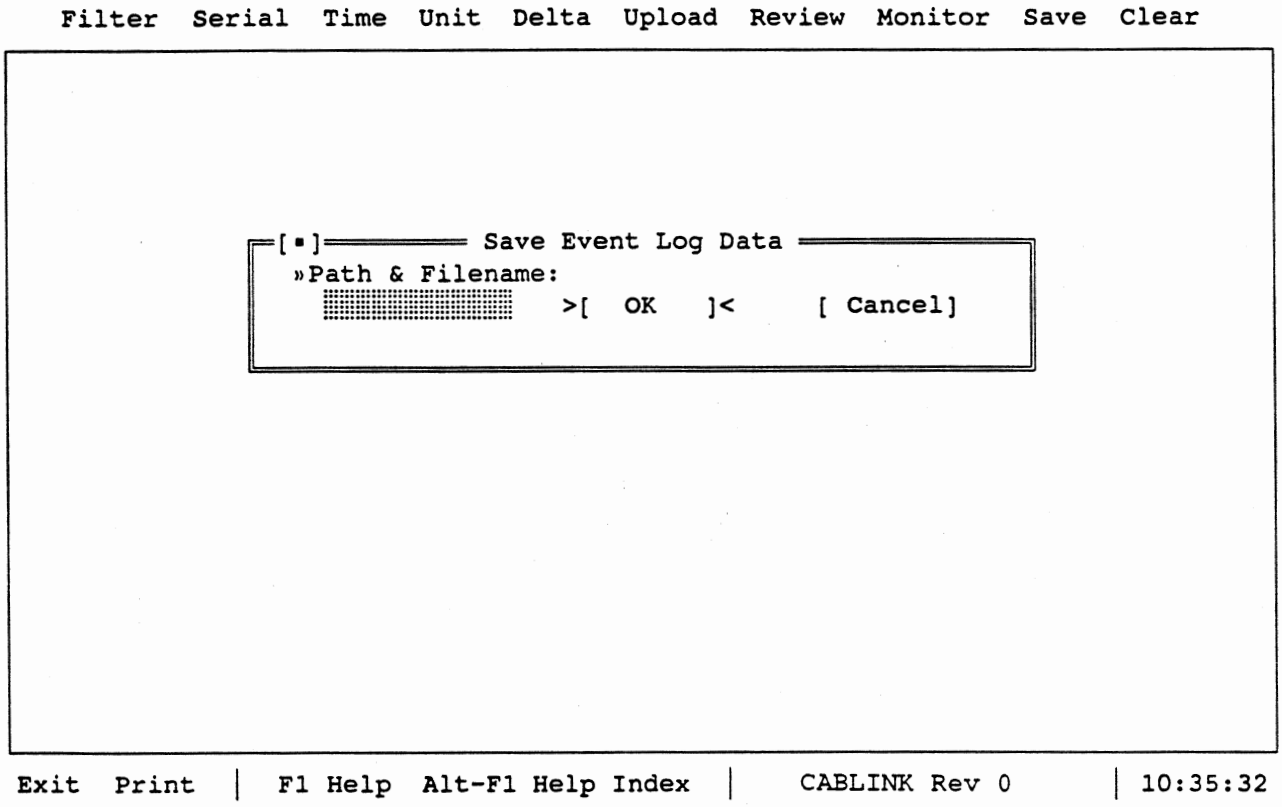
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Save Event Log Data
»Path & Filename:
>[OK]<
[Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:35:32

Figure 23

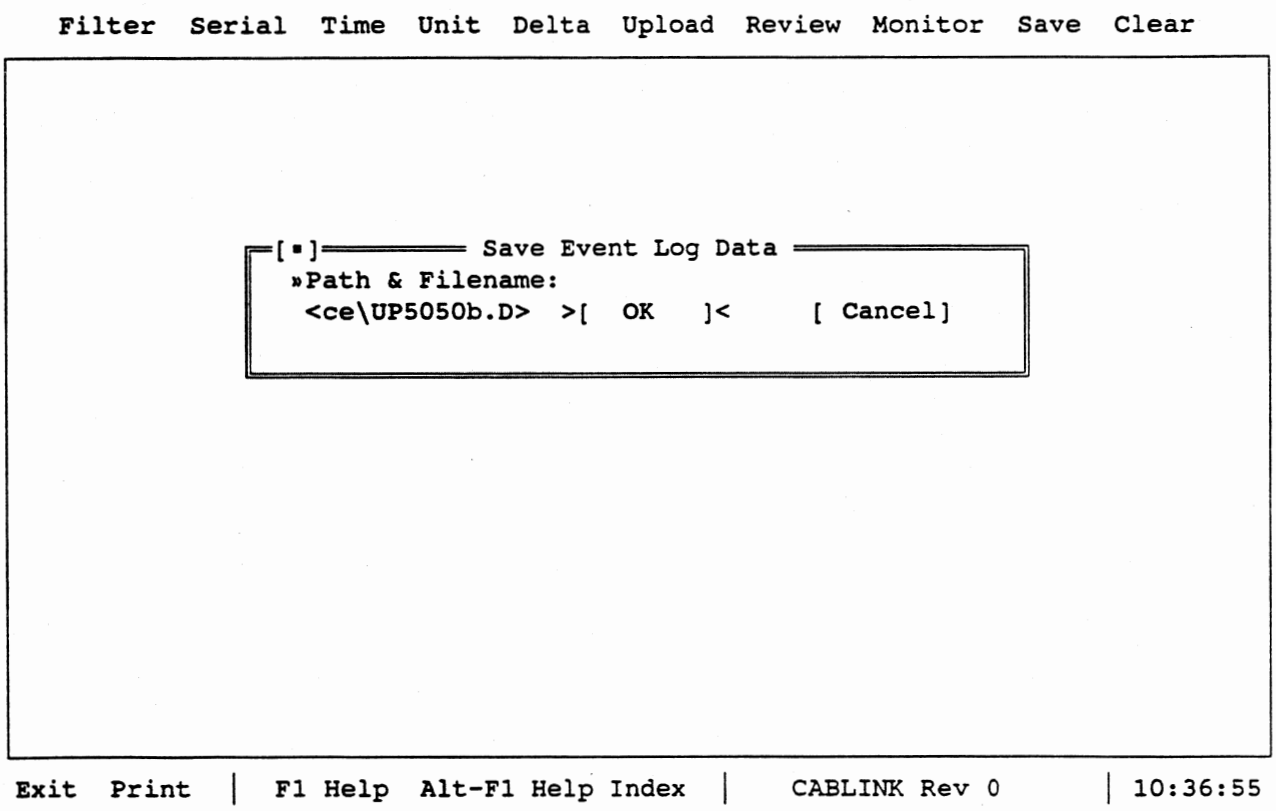
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Save Event Log Data
»Path & Filename:
<ce\UP5050b.D> >[OK]< [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:36:55

Figure 24

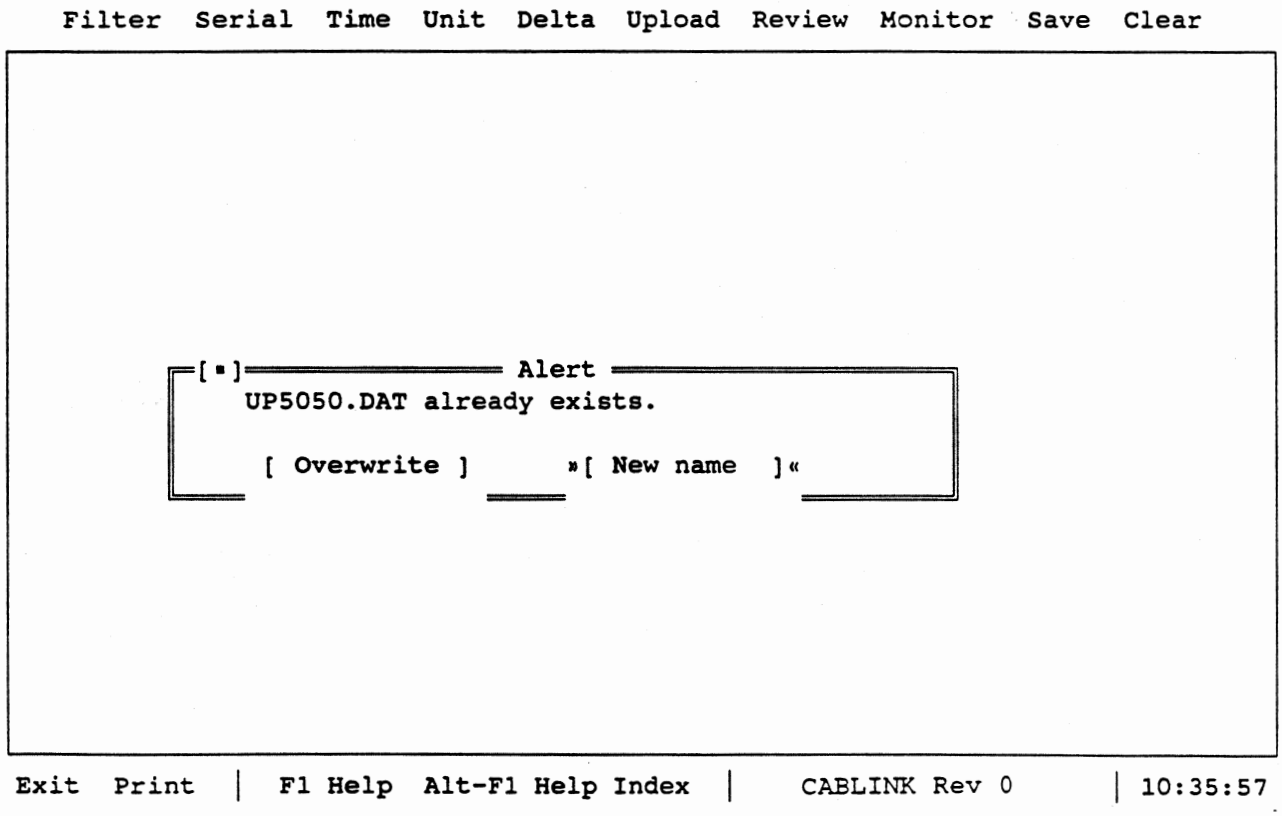
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪]
Alert
UP5050.DAT already exists.
[Overwrite]
»[New name]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:35:57

Figure 25

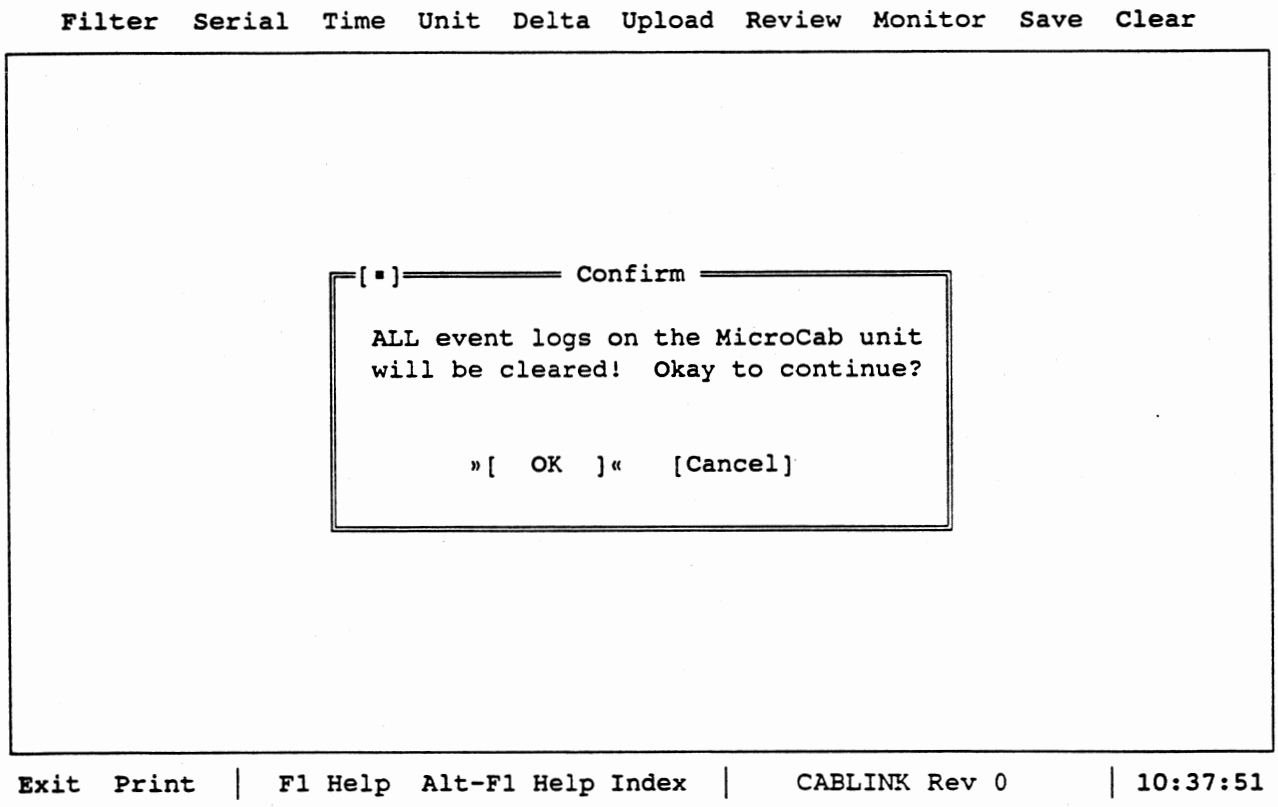
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Confirm
ALL event logs on the MicroCab unit will be cleared! Okay to continue?
»[OK]« [Cancel]
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:37:51

Figure 26

2.5 KEYS

2.5.1 Menu Bar:

```
Alt_F.....Filter - set viewing filters
Alt_S.....Serial - change serial port
Alt_T.....Time - set CAB date/time to match PC's
Alt_N.....Unit - change locomotive unit number
Alt_D.....Delta - turn CAB time normalization ON/OFF
Alt_U.....Upload - get event logs from CAB unit
Alt_R.....Review - look at uploaded event logs
Alt_M.....Monitor - simultaneously upload and view events
Alt_A.....Save - save current event log data to disk
Alt_C.....Clear - Clear CAB unit's event logs
```

a. Filter:

```
A..........All Classes
P..........Application
L..........Logic
D..........Decoder
T..........Tach & Test
1..........Vital Input 1
2..........Vital Input 2
V..........Vital Output
O..........Okay
C..........Cancel
Esc........Cancel
Tab........Move highlight
Enter......Select highlighted item
Space Bar...Select highlighted item
```

b. Serial:

```
K..........Okay
Esc........Cancel
Tab........Move    highlight
Enter......Select highlighted item
Space Bar...Select highlighted item
```

c. Time:

```
K..........Okay
Esc........Cancel
Tab........Move    highlight
Enter......Select highlighted item
Space Bar...Select highlighted item
```

d. Unit:

O.....Okay
C.....Cancel
Esc.....Cancel
digits 0 through 9 (when working in "Unit Number:" field) Tab.....Move highlight
Enter.....Select highlighted item
Space Bar...Select highlighted item

e. Delta:

K.....Okay
Esc.....Cancel
Tab.....Move highlight
Enter.....Select highlighted item
Space Bar...Select highlighted item

f. Upload:

K.....Okay
Tab.....Move highlight
Enter.....Select highlighted item
Space Bar...Select highlighted item
During upload, pressing ANY key aborts

g. Review:

Read File:

Name:
Enter....display file(s) which match pattern in "Name"
Letters and digits, in "Name" field
Tab.....moves highlight to "Files" list

Files:
arrow keys move highlight
Tab.....moves highlight to "Okay" button
Enter...selects highlighted file name
Esc.....Cancel
O.....Open selected file

Viewer:

Esc...Cancel
Up Arrow, DownArrow
Page Up, Page Down
Home, End
Ctrl_Page Up, Ctrl_Page Down

h. Monitor:

Esc...Cancel
UpArrow, DownArrow
Page Up, Page Down
Home, End
Ctrl_Page Up, Ctrl_Page Down

i. Save:

K.....Okay
Esc.....Cancel
Tab.....Move highlight
Enter.....Select highlighted item
Space Bar...Select highlighted item
In the "Save As" field:
Letters and numbers
Enter
Tab

j. Clear:

K.....Okay
Esc.....Cancel
Tab.....Move highlight
Enter.....Select highlighted item
Space Bar...Select highlighted item

k. Print:

Esc.....Cancel
O.....Okay,printreport
Enter.....Accept current settings
P.....Send to Printer
F.....Send to File
Y.....Yes, apply viewing Filters to the report
N.....No, don't apply viewing Filters to the report
Arrow keys...Change selected option
Tab.....Changes highlighted dialog box section
Ctrl_Page Up, Ctrl_Page Down

2.5.2 Status Bar:

```
Alt_X.....Exit - quit running CABLINK, return to DOS
Alt_F1....Help Index - index of all help topics
F1........Help - context-sensitive help
```

a. Help:

```
D.....Cancel (Done)
Esc...Cancel
UpArrow, DownArrow
Page Up, Page Down
Home, End
```

b. Help Index:

```
O..........Okay
C..........Cancel
Esc........Cancel
Tab........Move highlight
Enter......Select highlighted item
Space Bar...Select highlighted item
Cursor keys (arrows, PgUp, PgDn, Home, End) scroll
        list of topics
```

2.6 DIAGNOSTICS

If an error condition occurs, CABLINK will automatically attempt to correct it. If the error can not be corrected automatically, you will be advised of the error and given as much practical advice as possible on correcting it.

a. Locomotive Unit Number must be four digits - You entered something other than four numeric digits. For example:

RIGHT	WRONG
0001	1
0101	101
1234	ab3e
9999	<nothing>

When CABLINK is started, you must enter a valid Unit Number before you can continue (Figure 9).

b. Error writing to XXXXXXXX.XXX. Disk may be full. - CABLINK was unable to write as much data as it tried to, during the "Save" function. Check to see if the target disk or diskette is full (Figure 27).

c. Cannot open XXXXXXXX.XXX for writing. - During "Save" function, the target file could not be opened. See if diskette is write-protected or not inserted fully (Figure 28).

d. Critical disk error on drive X - This message appears on the Status Line, and usually results from trying to write to a read-only diskette (Figure 29)).

e. Disk is not ready in drive X - Status Line message, diskette may not be fully inserted (Figure 30).

f. Could not open UCM.HLP for reading. - Help topics are loaded when CABLINK is started. If there is a problem with this, it may mean that the help file is missing (Figure 31).

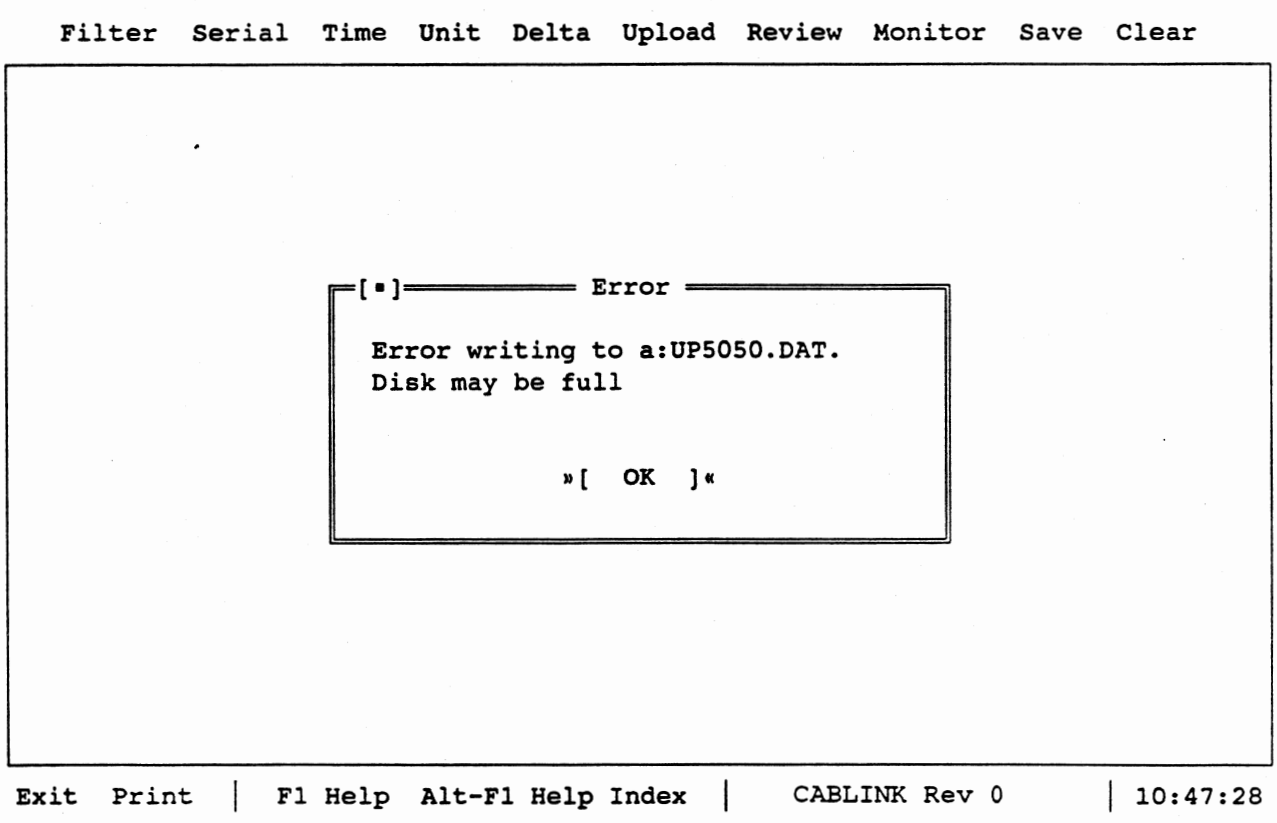
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Error
Error writing to a:UP5050.DAT.
Disk may be full
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:47:28

Figure 27

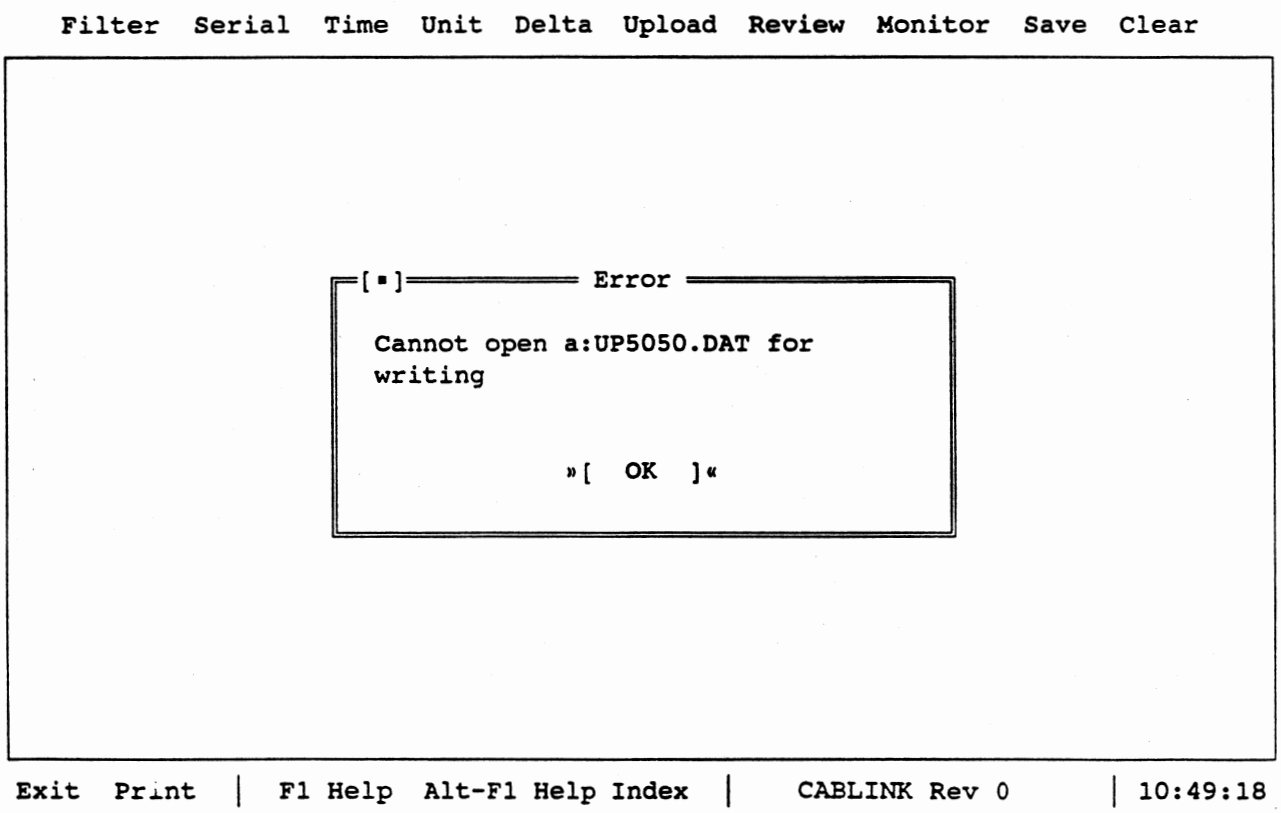
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[▪] Error
Cannot open a:UP5050.DAT for writing
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 10:49:18

Figure 28

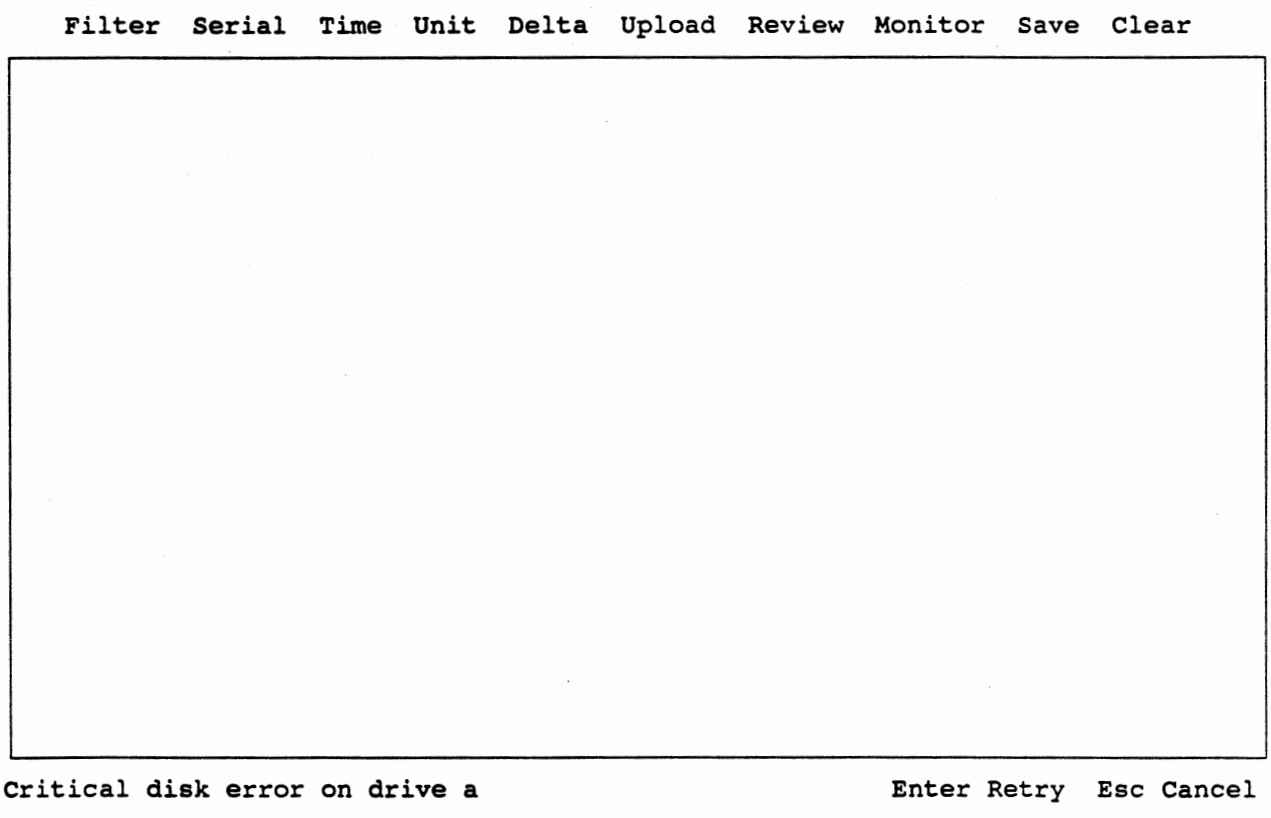
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Critical disk error on drive a
Enter Retry Esc Cancel

Figure 29

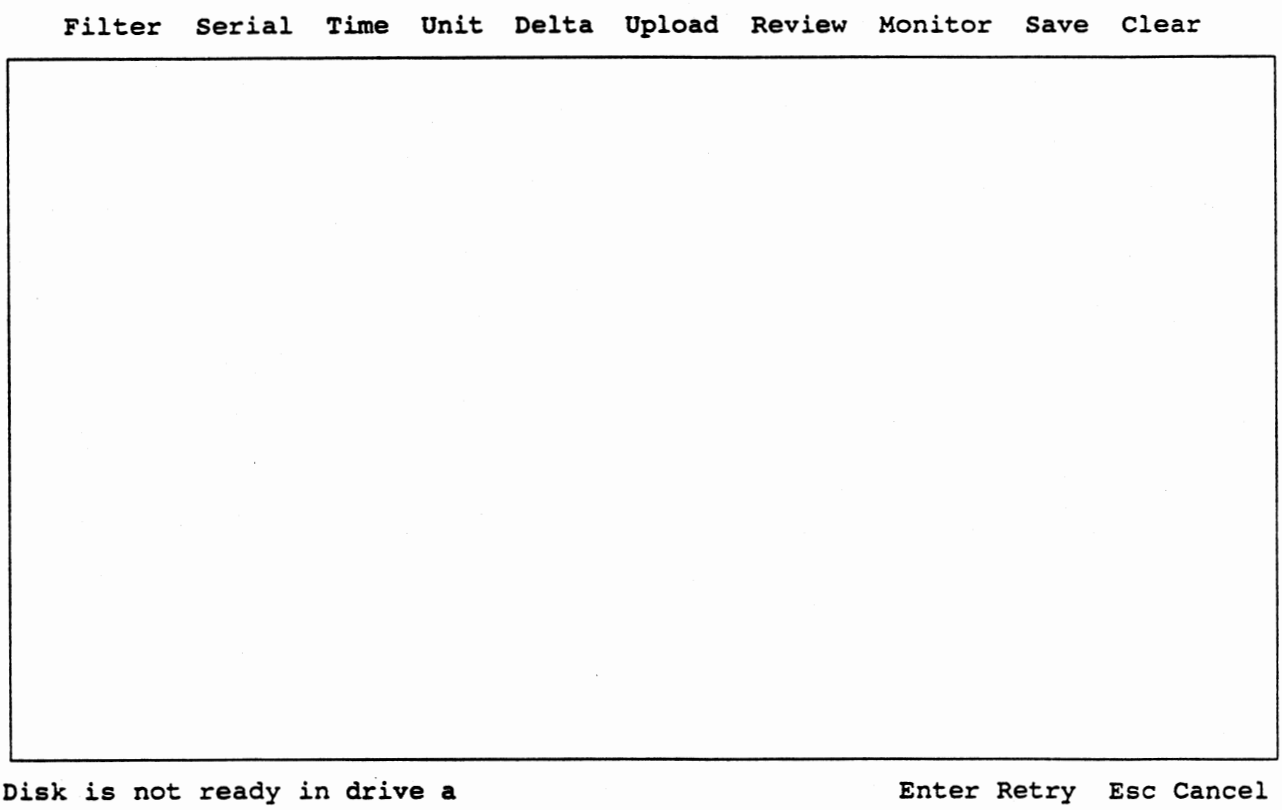
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
Disk is not ready in drive a
Enter Retry Esc Cancel

Figure 30

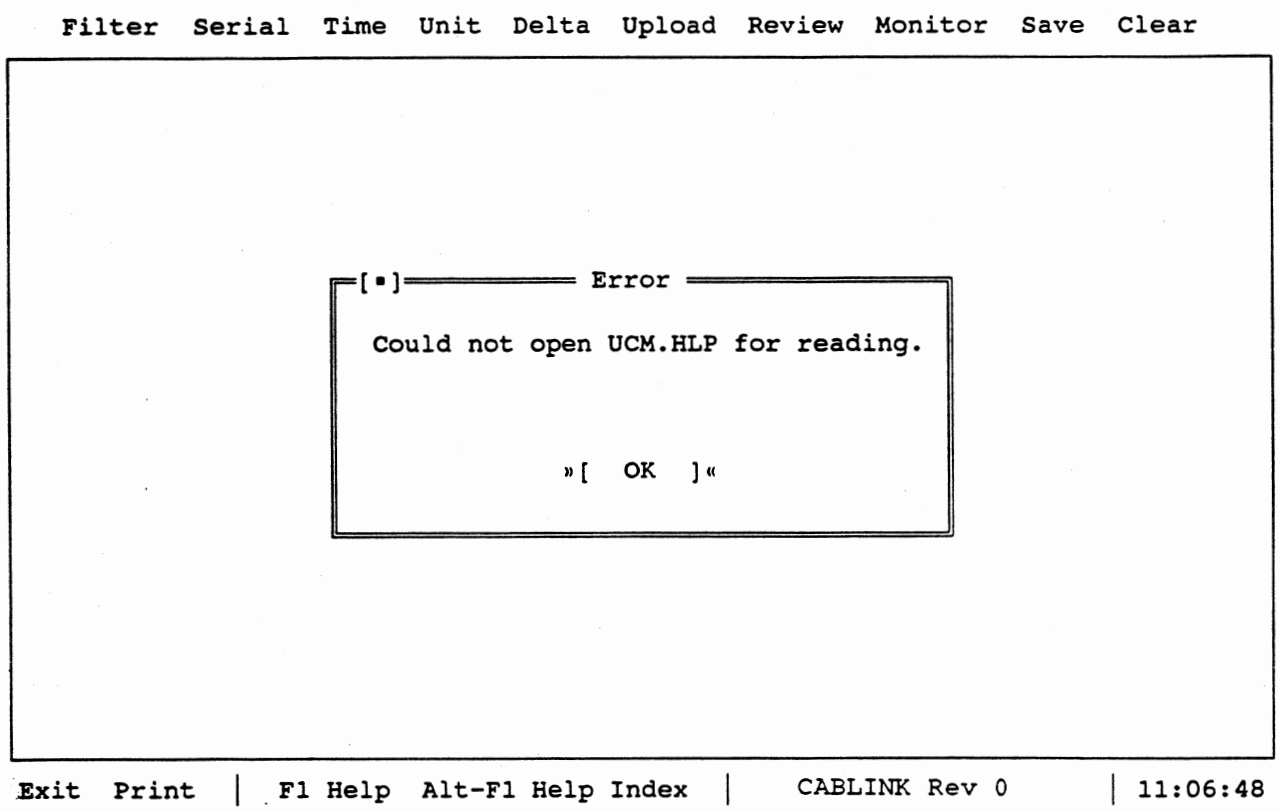
Filter Serial Time Unit Delta Upload Review Monitor Save Clear
[•]
Error
Could not open UCM.HLP for reading.
»[OK]«
Exit Print | F1 Help Alt-F1 Help Index | CABLINK Rev 0 | 11:06:48

Figure 31

2.7 Detail

The data file, as stored on disk, is not intended to be viewed directly. The following information is provided for trouble-shooting purposes only.

Certain data are prefaced by a keyword, denoted by a "%" prefix. The keywords currently in use are:

%UNIT ..... Locomotive unit number, entered by user

%PCCLOCK ..... The PC date and time the data file was written

%CABCLOCK: ... The CAB date and time when the upload started

%DELTA: ..... The difference between the PC date/time and the CAB date/time

Each Event record contains several fields, as follows:

cc ee hh:mm:ss.t dd-mmm-yy

"cc"..... is the Event Class
"ee" ..... is the Event code
"hh:mm:ss.t"... is the time the event occurred
"dd-mmm-yy" ... is the date the event occurred

The time and date in each record will be saved with the %TIMEDELTA parameter applied, unless you had turned this off in Setup before the upload.

A typical data file will look like this:

```
%UNIT9090
%PCCLOCK : Dec 15 11:24:52 1993
%CABCLOCK: Dec 15 11:24:51 1993
%DELTA:  1
00 47        08:41:23.3   17-Dec-93
00 48        08:41:23.3   17-Dec-93
01 27        08:41:23.3   17-Dec-93
03 03        08:41:23.3   17-Dec-93
04 03        08:41:23.3   17-Dec-93
05 03        08:41:23.3   17-Dec-93
06 03        08:41:23.3   17-Dec-93
00 47        11:23:56.3   17-Dec-93
00 48        11:23:56.3   17-Dec-93
      .
      .
   (and so on)
      .
      .
      .
```

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SECTION III
EVENT LOGS

Failure event classes have counters associated with each event which may be viewed from the front panel. Event counters may be cleared from either the PC or the front panel. Informational event classes cannot be viewed from the front panel but are only accessible through the serial data link. This approach provides the feature that a unit operating without any failures will not report any events when interrogated from the front panel. Events are only reported on the front panel if failures have been detected.

The following classes of events are logged by the MicroCab™ unit:

a. APPLICATION (Event Class 0): Informational events related to transitions of specific I/O points and operational conditions.

b. LOGIC (Event Class 1): Failure events related to the operational software and hardware of the Logic Sub-system CPU PCB.

c. DECODER (Event Class 2): Failure events related to the operational software and hardware of the Decoder Sub-system CPU and Analog Input PCBs.

d. TACH & TEST (Event Class 3): Failure events related to the Tach & Test PCB hardware.

e. VITAL INPUT PCB 1 (Event Class 4): Failure events related to Vital Input PCB hardware. Specific to the Input PCB associated primarily with C&NW inputs.

f. VITAL INPUT PCB 2 (Event Class 5): Failure events related to Vital Input PCB hardware. Specific to the input PCB associated primarily with UP inputs.

g. VITAL OUTPUT PCB (Event Class 6): Failure events related to Vital Output Driver PCB hardware.

3.1 APPLICATION EVENTS

This class of informational events is related to transitions of specific I/O points and operational conditions.

Within the APPLICATION class the following informational events are detected and logged by the system.

Event	Description
1	UP cab signal cutin. Result of transition of UP CUTOUT switch from CUTOUT to CUTIN position.
2	UP cab signal cutout. Result of transition of UP CUTOUT switch from CUTIN to CUTOUT position.
3	UP cab signal partial cutout. Result of pull and release of the UP partial cutout switch. Indicates operator request, not necessarily system operation.
4	UP departure test switch on. Result of transition of UP departure test switch from OFF to ON position.
5	UP departure test switch off. Result of transition of UP departure test switch from ON to OFF position.
6	UP EPV output on. Result of transition of the UP EPV output from OFF to ON state.
7	UP EPV output off. Result of transition of the UP EPV output from ON to OFF state.
8	UP upgrade to APPROACH aspect. Result of an aspect change from RESTRICTED.
9	UP upgrade to APPROACH MEDIUM aspect. Result of an aspect change from RESTRICTED or APPROACH.
10	UP upgrade to CLEAR aspect. Result of an aspect change from RESTRICTED, APPROACH, or APPROACH MEDIUM.
11	UP downgrade to RESTRICTED aspect. Result of an aspect change from CLEAR, APPROACH MEDIUM, or APPROACH.
12	UP downgrade to APPROACH aspect. Result of an aspect change from CLEAR or APPROACH MEDIUM.
13	UP downgrade to APPROACH MEDIUM aspect. Result of an aspect change from CLEAR.
14	Reserved.
15	C&NW cab signal cutin. Result of transition of C&NW CUTOUT switch from CUTOUT to CUTIN position.
16	C&NW cab signal cutout. Result of transition of C&NW CUTOUT switch from CUTIN to CUTOUT position.
17	C&NW arm switch activated. Result of push and release of C&NW ARM switch. Indicates operator request, not necessarily system operation.
18	C&NW departure test switch on. Result of transition of C&NW departure test switch from OFF to ON position.
19	C&NW departure test switch off. Result of transition of C&NW departure test switch from ON to OFF position.
20	C&NW EPV output on. Result on transition of C&NW EPV output from OFF to ON state.

21	C&NW EPV output off. Result of transition of C&NW EPV output from ON to OFF state.
22	C&NW upgrade to CLEAR aspect. Result of aspect change from RESTRICTED.
23	Reserved.
24	Reserved.
25	C&NW downgrade to RESTRICTED aspect. Result of aspect change from CLEAR.
26	C&NW cab signal armed.
27	C&NW motion light on. Result of transition of C&NW MOTION LIGHT output from OFF to ON state.
28	C&NW motion light off. Result of transition of C&NW MOTION LIGHT output from ON to OFF state.
29	Reserved.
30	Acknowledge switch activated. Result of push and release of ACKNOWLEDGE switch.
31	Full Service brake set. Result of transition of SERVICE BRAKE transducer input from OFF to ON.
32	Full Service brake released. Result of transition of SERVICE BRAKE transducer input from ON to OFF.
33	Engine brake set. Result of transition of ENGINE BRAKE transducer input from OFF to ON.
34	Engine brake released. Result of transition of ENGINE BRAKE transducer to ON to OFF.
35	UP departure test failed to detect 180 code. Result of failure of Decoder Sub-system to detect or report the presence of a simulated 180 code.
36	UP departure test failed to detect 120 code. Result of failure of Decoder Sub-system to detect or report the presence of a simulated 120 code.
37	UP departure test failed to detect 75 code. Result of failure of ecoder Sub-system to detect or report the presence of a simulated 75 code.
38	UP departure test failed to detect a no-code condition. Result of failure of Decoder Sub-system to detect a no-code condition from a simulated 180 code injected below the calibration level.
39	C&NW departure test failed to detect carrier. Result of failure of Decoder Sub-system to detect or report the presence of a simulated steady carrier.
40	C&NW departure test failed to detect no-carrier. Result of failure of Decoder Sub-system to detect loss of steady carrier from a simulated carrier injected below the calibration level.
41	C&NW departure test cannot update configuration. Result of failure to configure changed parameters for C&NW clear overspeed setpoint or wheel wear adjustment. Always accompanied by event 44.

42	UP departure test completed.
43	C&NW departure test completed.
44	Default configuration assumed by system. Result of failure to correctly read configuration parameters from EEPROM. Also may be a result of configuration parameters out of legal ranges.
45	CPS shutdown due to tachometer mismatch. Result of mismatch between parallel counters used to measure train speed from tachometer pickup.
46	Reserved.
47	CPS shutdown due to failure of -1703 board. Refer to VITAL OUTPUT BOARD class for associated failure event(s).
48	CPS shutdown due to failure of -0404 board. Refer to TACH & TEST BOARD class for associated failure event(s).
49	reserved
50	UP dropout due to low signal level.
51	UP dropout due to period or duty cycle.
52	C&NW dropout due to low signal level.
53	C&NW dropout due to signal integrity.

3.2 LOGIC EVENTS

This class of events is related to the operational software and hardware of the Logic sub-system CPU PCB.

Within the LOGIC class the following failure events are detected and logged by the system.

Event	Description
1	Reserved.
2	Reserved.
3	CPU branch instruction test failure. Result of a software detected diagnostic failure in the execution of branch instructions.
4	CPU instruction test failure. Result of a software detected diagnostic failure in the execution of CPU instructions.
5	CPU stack pointer overflow. Result of CPU stack pointer corruption or an internal software error that incorrectly manipulates the stack.
6	CPU stack pointer underflow. Result of CPU stack pointer corruption or an internal software error that incorrectly manipulates the stack.
7	FIRQ interrupt return address out of range. Result of stacked return address found to be outside of legal EPROM memory area.
8	IRQ interrupt return address out of range. Result of stacked return address found to be outside of legal EPROM memory area.
9	Illegal FIRQ interrupts received. Result of illegal or unknown interrupt source to FIRQ interrupt request of CPU.
10	Illegal IRQ interrupts received. Result of illegal or unknown interrupt source to IRQ interrupt request of CPU.
11	CPU diagnostic task execution failure. Result of incorrect execution of CPU diagnostic task.
12	CPU RAM test failure. Result of incorrect operation of one or more static memory locations on the CPU board.
13	CPU EPROM checksum failure. Result of incorrect operation of one or more read-only memory locations on the CPU board.
14	CPU address bus failure. Result of incorrect operation of the address bus local to the CPU board.
15	CPU data bus failure. Result of incorrect operation of the data bus local to the CPU board.
16	VIA1 register failure. Result of incorrect register operation within the IC device in socket U24 on the CPU board.

LOGIC EVENTS CONT'D

17	VIA2 register failure. Result of incorrect register operation within the IC device in socket U25 on the CPU board.
18	CPU time source error. Result of difference between primary and secondary CPU time sources.
19	Double load error. Result of mismatch between two copies of a double stored system variable.
20	Double path error. Result of mismatch between two copies of a double pathed system variable.
21	Task checksum error. Result of failure of specific system tasks to execute in the expected manner.
22	Task execution error. Result of a failure of an individual system task to execute in the expected manner.
23	Illegal range error. Result of a critical system variable out of its legal range.
24	Attempted division by zero. Result of an attempt to divide by 0.
25	Vital timer error. Result of incorrect operation of a vital software timer.
26	Illegal state error. Result of a critical system variable that indicates an illegal or undefined condition.
27	Timeout on decoder message transmission. Result of failure of Decoder Sub-system to receive a message transmitted by the Logic Sub-system.
28	Timeout on decoder message reception. Result of failure of :Logic Sub-system to receive a message from the Decoder Sub-system.
29	Reserved.
30	Logic - Decoder link failure. Result of communication link failure between Logic and Decoder sub-systems.
31	Message checksum error. Result of checksum error in a message received from the Decoder Sub-system.
32	Message walking-one's error. Result of walking one's bit pattern error in a message received from the Decoder Sub-system.
33	Message data complement error. Result of corruption of data or its complement in a message received from the Decoder Sub-system.
34	Speed sensor input limited by the system. Result of an inappropriately high frequency signal detected at the speed sensor input that indicates a speed greater than 127 MPH.
35	Speed calculation error. Result of a detected error in the speed calculation.

3.3 DECODER EVENTS

The class of events is related to the operational software and the hardware of the Decoder Sub-system CPU and Analog Input PCBs.

Within the DECODER class the following failure events are detected and logged by the system.

Event	Description
0	Reserved.
1	Reserved.
2	Double load error. Result of mismatch between two copies of a double stored system variable.
3	Double path error. Result of mismatch between two copies of a double pathed system variable.
4	CPU branch instruction test failure. Result of a software detected diagnostic failure in the execution of branch instructions.
5	CPU instruction test failure. Result of a software detected diagnostic failure in the execution of CPU instructions.
6	VIA1 register failure. Result of incorrect register operation within the IC device in socket U24 on the CPU board.
7	VIA2 register failure. Result of incorrect register operation within the IC device in socket U25 on the CPU board.
8	Task execution error. Result of a failure of an individual system task to execute in the expected manner.
9	CPU stack pointer overflow. Result of CPU stack pointer corruption or an internal software error that incorrectly manipulates the stack.
10	CPU stack pointer underflow. Result of CPU stack pointer corruption or an internal software error that incorrectly manipulates the stack.
11	FIRQ interrupt return address out of range. Result of stacked return address found to be outside of legal EPROM memory area.
12	IRQ interrupt return address out of range. Result of stacked return address found to be outside of legal EPROM memory area.
13	Illegal FIRQ interrupts received. Result of illegal or unknown interrupt source to FIRQ interrupt request of CPU.
14	Illegal IRQ interrupts received. Result of illegal or unknown interrupt source to IRQ interrupt request of CPU.
15	CPU time source error. Result of difference between primary and secondary CPU time sources.

16	CPU diagnostic task execution failure. Result of incorrect execution of CPU diagnostic task.
17	CPU RAM test failure. Result of incorrect operation of one or more static memory locations on the CPU board.
18	CPU EPROM checksum failure. Result of incorrect operation of one or more read-only memory locations on the CPU board.
19	CPU address bus failure. Result of incorrect operation of the address bus local to the CPU board.
20	CPU data bus failure. Result of incorrect operation of the data bus local to the CPU board.
21	VPA access count error. Result of incorrect number of bus accesses to Analog Input board by the decoder CPU board.
22	VPA echo error. Result of incorrect data bus echo read from Analog Input board.
23	Task checksum error. Result of failure of specific system tasks to execute in the expected manner.
24	Illegal range error. Result of a critical system variable out of its legal range.
25	Attempted division by zero. Result of an attempt to divide by 0.
26	Reserved.
27	Vital timer error. Result of incorrect operation of a vital software timer.
28	Reserved.
29	Reserved.
30	Reserved.
31	Reserved.
32	A/D failure on -1705 board. Result of failure of A/D on the Analog Input board to respond.
33	A/D reference error on -1705 board. Result of reference voltage to A/D on the Analog Input board out of range.
34	A/D input gain test error on -1705 board. Result of incorrect voltage readings during gain test of A/D on Analog Input board.
35	D/A-A/D voltage ramp error on -1705 board. Result of incorrect A/D voltage readings during linearity test of D/A on Analog Input board.
36	Reserved.
37	Illegal state error. Result of a critical system variable that indicates an illegal or undefined condition.
38	Reserved.

39	Timeout on message reception from -0101 CPU. Result of failure of Logic Sub-system to receive a message from the Decoder Sub-system.
40	Timeout on message transmission to -0101 CPU. Result of failure of Decoder Sub-system to receive a message transmitted by the Logic Sub-system.
41	Checksum error in message from -0101 CPU. Result of checksum error in a message received from the Decoder Sub-system.
42	Protocol error in message from -0101 CPU. Result of walking one's bit pattern error in a message received from the Decoder Sub-system.
43	Link failure between -0101 and -0104 CPU boards. Result of communication link failure between Logic and Decoder Sub-systems.
44	Complement error in message from -0101 CPU. Result of corruption of data or its complement in a message received from the Decoder Sub-system.

3.4 TACH & TEST EVENTS

This class of events is related to the hardware of the Tachometer & Test PCB.

Within the TACH & TEST class the following failure events are detected and logged by the system.

Event	Description
1	VPA echo error. Result of incorrect data bus echo from Tach & Test board. Indicates glitch detected in data read or write operation.
2	VPA echo corrupted. Result of mismatch between expected and actual data bus echo from. Indicates incorrect access to board or board addressing problem.
3	VPA type register error. Result of incorrect type register value read from Tach & Test board.
4	Reserved.
5	VIA register failure. Result of incorrect register operation with the IC device in socket U7 on the Tach & Test board.

3.5 VITAL INPUT #1 (#2) EVENTS

These classes of events are related to Vital Input PCB hardware. (#1) is specific to the Input PCB associated primarily with C&NW inputs, (#2) is specific to the Input PCB associated primarily with UP inputs

Within the VITAL INPUT PCB classes the following failure events are detected and logged by the system. Failure events within these classes result in degraded operation since failed inputs are processed as off states.

Event	Description
1	VPA echo register error. Result of incorrect data bus echo from Vital Input board. Indicates glitch detected in data read or write operation.
2	VPA echo register corrupted. Result of mismatch between expected and actual data bus echo from. Indicates incorrect access to board or board addressing problem.
3	VPA type register error. Result of incorrect type register value read from Vital Input board.
4	Reserved.
5	Input 0 unstable. The input signal sampled appeared to oscillate at some frequency above 60 Hz.
6	Input 1 unstable.
7	Input 2 unstable.
8	Input 3 unstable.
9	Input 4 unstable.
10	Input 5 unstable.
11	Input 6 unstable.
12	Input 7 unstable.
13	Input 0 shorted. Input appeared shorted to some other input on the PCB. Input was sampled on but turned off when other input was "short" checked.
14	Input 1 shorted.
15	Input 2 shorted.
16	Input 3 shorted.
17	Input 4 shorted.
18	Input 5 shorted.
19	Input 6 shorted.
20	Input 7 shorted.
21	Input 0 failed monitor check. Input appeared on but failed to turn off when monitor checked.
22	Input 1 failed monitor check.
23	Input 2 failed monitor check.
24	Input 3 failed monitor check.
25	Input 4 failed monitor check.
26	Input 5 failed monitor check.
27	Input 6 failed monitor check.
28	Input 7 failed monitor check.

3.6 VITAL OUTPUT EVENTS

This class of events is related to the Vital Output PCB.

Within the VITAL OUTPUT PCB class the following failure events are detected and logged by the system.

Event	Description
1	VPA echo register error. Result of incorrect data bus echo from Vital Output board. Indicates glitch detected in data read or write operation.
2	VPA echo register corrupted. Result of mismatch between expected and actual data bus echo from. Indicates incorrect access to board or board addressing problem.
3	VPA type register error. Result of incorrect type register value read from Vital Output board.
4	Reserved.
5	A/D failure. Result of incorrect operation with the IC device socket U19 on the Vital Output Board.
6	CPS voltage out of range.
7	A/D reference voltage out of range.
8	CPS check pulse failure. Voltage measurement of check pulse injected into the CPS input channel was out of range.
9	D/A to A/D voltage ramp test failure. Result of voltage measurements from A/D being out of range during voltage ramp test.
10	Internal error detected in -1703 driver.
11	Output 0 check pulse failure. Voltage measurement of check pulse injected into the channel was out of range.
12	Output 1 check pulse failure.
13	Output 2 check pulse failure.
14	Output 3 check pulse failure.
15	Output 4 check pulse failure.
16	Output 5 check pulse failure.
17	Output 6 check pulse failure.
18	Output 7 check pulse failure.
19	Output 8 check pulse failure.
20	Output 9 check pulse failure.
21	Output 10 check pulse failure.
22	Output 11 check pulse failure.
23	Output 12 check pulse failure.
24	Output 13 check pulse failure.
25	Output 14 check pulse failure.
26	Output 15 check pulse failure.
27	Output 0 shorted. Output appeared shorted to some other output channel on the PCB. Output changed state when other output channel was tested.

VITAL OUTPUT EVENTS CONT'D

28	Output 1 shorted.
29	Output 2 shorted.
30	Output 3 shorted.
31	Output 4 shorted.
32	Output 5 shorted.
33	Output 6 shorted.
34	Output 7 shorted.
35	Output 8 shorted.
36	Output 9 shorted.
37	Output 10 shorted.
38	Output 11 shorted.
39	Output 12 shorted.
40	Output 13 shorted.
41	Output 14 shorted.
42	Output 15 shorted.
43	Output 0 flip test failed. Output channel, when requested on, failed to momentarily turn off when tested.
44	Output 1 flip test failed.
45	Output 2 flip test failed.
46	Output 3 flip test failed.
47	Output 4 flip test failed.
48	Output 5 flip test failed.
49	Output 6 flip test failed.
50	Output 7 flip test failed.
51	Output 8 flip test failed.
52	Output 9 flip test failed.
53	Output 10 flip test failed.
54	Output 11 flip test failed.
55	Output 12 flip test failed.
56	Output 13 flip test failed.
57	Output 14 flip test failed.
58	Output 15 flip test failed.
59	Output 0 in wrong state. Output channel detected in state opposite of that requested.
60	Output 1 in wrong state.
61	Output 2 in wrong state.
62	Output 3 in wrong state.
63	Output 4 in wrong state.
64	Output 5 in wrong state.
65	Output 6 in wrong state.
66	Output 7 in wrong state.
67	Output 8 in wrong state.
68	Output 9 in wrong state.
69	Output 10 in wrong state.
70	Output 11 in wrong state.
71	Output 12 in wrong state.
72	Output 13 in wrong state.
73	Output 14 in wrong state.
74	Output 15 in wrong state.

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